RAILROAD GAZETTE

FRIDAY, MAY 8.

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Contributions.

Correction of Accident Record.

CHESAPEAKE & OHIO RAILWAY CO.,
RICHMOND, Va., May 2, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I notice in your list of accidents occurring in March, a derailment charged to this road at Bethpage, Tenn. As our lines do not extend into that state, you must be in error. No such accident occurred on this road.

G. W. STEVENS, General Superintendent.

[Bethpage is on the Chesapeake & Nashville.—EDITOR.]

The Dangers of Steam Heating.

Mason Regulator Co.,
BOSTON, Mass., May 4, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Some weeks ago a statement was made in your paper by an eminent gentleman who holds a high official position, regarding the danger of using a reducing valve in which springs were an important part of the construction. His statement was to the effect that if any of the springs should give out, the full steam pressure would be applied to the train pipe. We had not thought of saying anything about the matter until we found that the question was regarded so seriously. We therefore beg to make your readers acquainted with some experiments recently made with the Mason valve by the Boston & Albany Railroad, entirely without our solicitation, and afterward repeated by us with the same results.

The valve was placed in a steam pipe with the ordinary conditions of car heating. Successive tests were made with each spring taken out, and it was found that when the high pressure was let on the valve, instead of allowing the steam to pass through, it remained closed. Finally, the valve was deprived of all its springs, with the same result. This experiment, upon the authority of the road above quoted, seems to prove that a reducing valve whose action depends upon springs can be so constructed that it will shut off the steam if one or all the springs break.

WALTER G. CHASE, Treas.

English and American Freight Rates.

TO THE EDITOR OF THE RAILROAD GAZETTE:

After the undeservedly kind manner in which the *Railroad Gazette* has spoken of my new book as a whole, it is perhaps ungracious to ask to be allowed to defend myself against your only seriously unfavorable criticism. But I value so highly the good opinion of the *Gazette*, and I am so reluctant to seem to have repaid the courtesy of American railway officials in furnishing me with information by misrepresenting the purport of it, that I will venture to ask for a few lines of your space.

You say that in "giving comparative rates on produce of various kinds in England and America, . . . it is not made sufficiently clear that the American figures thus chosen are exceptionally high, and the English rates more or less typical. The comparison thus appears too favorable to the English railroads."

I think I have done all I could to warn my readers. Here is what I have said (p. 240) in introducing the subject: "Let it be frankly confessed that in one sense the rates which follow cannot be asserted to be typical of American rates. The average American rate is ⅗d. per ton per mile, and if the rates given below appear to be, as they in fact are, a good deal higher than this, there must of necessity be an equal number of other rates so much lower than the ⅗d. as to redress the balance. . . . Here any way are rates actually in force. If they prove nothing else, they at least prove this, that it is as easy to produce figures to show the moderation of English charges as it is to find others to convict them of being excessive and extortionate."

Again, on p. 245, I have once more repeated that "the average American rate is immeasurably lower than ours." If I am wrong in thinking that the American rates which I have quoted for fruit and other perishable traffic, and for short-distance service from New York and Chicago, are typical rates *for that kind of traffic*, I much regret the fact; but I can honestly say that, when I quoted them, I believed them to be so. The rate of 31 cents for first class traffic to points 50 miles from Chicago was specially given me in answer to a request for "a fair average rate."

W. M. ACWORTH.

Coupler Unlocking Devices.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I notice an article in your issue of April 17 in relation to unlocking devices for automatic couplers. I have had eight years' experience in the application of both types of couplers, and have applied the rod both above and below the end sill, but since handling the M. C. B. type have strenuously advocated the upper lifting rod of 1 inch diameter, made and applied with brackets in the simplest manner possible, so that if broken or bent they can be replaced or repaired at any blacksmith shop, and can be applied to any coupler that has a lock lifting from above in or near the centre of the drawhead.

The Janney, the Dowling, and others of this class, have tried under-unlocking devices, but all have abandoned them, and the practice now obtains to use the upper lifting rod on all the leading couplers, such as the Janney, Gould, Thurmond and Standard.

The objections to a change now are:

1. The "under-locking" devices are all different in their design and method of operating them, and it would be necessary to adopt one coupler for the sake of uniformity.

2. They are more liable to be broken in many ways, among which is in the "shop yards" they frequently have wheels on the tracks the flanges of which will scrape everything of that kind off, also the cars riding upon the dead woods and obstructions at the ends of sidings.

3. They have too many special parts, which when broken at a distance from the shops or storehouses are impossible to replace.

4. Any knuckle-opening device is necessarily directly or indirectly attached to the knuckle, and when the cars are thrown together quickly the knuckle will cause the handle of the rod to swing and fly in a dangerous manner, as was noticed in the Buffalo tests of the Boston Automatic.

5. The Central R. R. Club have taken up this matter carefully, and have wisely recommended the use of the upper rod.

I cannot understand how it is that it makes a coupler more *truly automatic* by opening it at the outside of the car than for the brakeman to open the knuckle by hand when the cars are at rest, and which is not done when the cars are being coupled, as with the link-and-pin, which the New York law directly refers to, and not to hook couplers or knuckles, as is assumed in another article in your issue of April 24th, in which reference is made to the "Trojan Coupler" as being *truly automatic*, but which it cannot be unless, like the Miller Hook, it requires no manipulation whatever to couple it. Neither can the knuckle of the Trojan Coupler be opened with a rod above the "buffer block" without complicated machinery, and it is open to the objection previously mentioned as to the swinging of the handle of the rod when below the end sill.

I see by an article in the same number that a coupler there represented has stood tests in tensile strain which to the writer's knowledge were much higher than is claimed for the Trojan, but the fact is that the tensile strength is not of so much importance except as a comparison between metals. It is toughness and form that will stand the buffing in service, which is the *sine qua non*.

The objection is also raised in the article that the rod and chain form an inefficient and imperfect device, on the contrary.

1. It admits of a simple and effective method of setting not to couple.

2. It will not require as much repair and expense as *any* under-unlocking device, and can be made uniform.

3. It is not inoperative in winter from being frozen to the car, if properly applied.

4. Its use cannot be restricted if the railroad companies wish to apply it in this way, as it is not necessary to go between the cars to uncouple with it.

T. L. MCKEEN.

Coke as Locomotive Fuel.

BUFFALO, May 5, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The account by Mr. T. H. Symington, of the Baltimore & Ohio, of coke burning on locomotives is very interesting, and that railroad is to be congratulated on the results which have been obtained. It is, I think, the first instance that an extensive and persistent effort has been made to use coke as fuel on locomotives in American practice, and it is to be hoped that it will be followed up.

From a not exhaustive trial made some years ago, I was convinced that it was perfectly feasible to burn coke in locomotives, if the duty required was not too great for the steaming capacity of the locomotive. But our American practice is very different from the European practice. We expect a greater service for the same capacity, and in all but local service all trains are usually made up to the full capacity of the locomotives, both in passenger or freight service. The boilers of our locomotives do not usually have an excess of capacity for the size of the cylinders, which is generally fixed to correspond with the weight on the drivers.

If the experiments now being conducted on the Baltimore & Ohio are continued it will possibly be found that locomotives built for anthracite coal will prove the most efficacious for burning coke; these two fuels being nearly the same chemically, very nearly the same construction of boilers, grates, draft arrangement, etc., will be found to work well with each. But coke probably requires a deeper bed than anthracite coal in order to keep up the same amount of combustion, because of the difference of bulk to weight.

Mr. Symington does not give any data of cost, or rather the relative cost of coke as compared with bituminous coal. This must of course be greater with coke, both on account of extra cost of the fuel itself, and also on account of the extra care of cleaning the flues, nettings, etc.; also from the fact that there is quite 20 per cent. less effective heat or energy in coke than in bituminous coal from which the coke is made.

It is to be hoped that we shall hear further from these experiments, and that some data in regard to cost will be given which will prove that the cost will not be in the way of a larger use of this desirable fuel on passenger trains. An additional cost of even 20 per cent. for fuel for passenger trains would not prove a great increase in the cost per passenger carried, and the comfort to passengers would be very much increased, and the addition in the traffic to the road adopting the cleanest fuel would undoubtedly more than pay the extra expense.

In reference to the arrangement of grates, although there should be a large grate opening, I think care and some experimenting should be used to arrive at the exact amount, and also the form of fire-box best adapted for this purpose. Too large openings will admit more air than necessary for perfect combustion, and consequently loss in applied heat by this extra air being brought to the point of combustion and passing off unused. With bituminous coal, the shallower the fire the nearer perfect combustion can be got in the ordinarily constructed furnace with anthracite coal or coke, deeper fires can be used; but in either case the best results are generally got with fires not more than 12 in. deep. With too deep fires there is greater danger of imperfect combustion.

Locomotives commonly called anthracite (that is, with the long, shallow fire-box, or with the "Wooten" or "Strong" types of boilers) should be good engines in which to burn coke. In fact, I am satisfied that the long, shallow fire-box with from 25 to 40 ft. of grate surface is preferable for all purposes to the short, deep box which was brought into service when wood was used as a fuel.

In reference to such details as size of nozzles, netting, etc., it is always desirable to use as large nozzles as possible, to avoid back pressure and avoid waste by too great draft. The size of the netting is of course regulated by the question of danger from setting fires along the road, and any variation from the standard practice would probably lead to trouble in claims for losses from fires.

The greatest factor in the problem is undoubtedly the question of educating the men to the use of this fuel, and that will be an easy matter as soon as it is understood that the attempt must be made a success.

F. M. WILDER.

The Shay Locomotive.

[WITH AN INSET.]

An engineer who has had some experience with the novel locomotive shown on the accompanying inset says that it can climb a tree, and that the only danger in using it is that it may run into itself. Probably this is what language sharps call hyperbole, but there is no doubt that it is useful on very heavy grades and sharp curves. On the Alleghany & Kinzua Railroad a 62-ton Shay engine has run some time on a grade of 264 ft. to the mile, with 22 degree curves, taking up two loaded 60,000-lb. cars. This road now has two of these engines, if not more. On the Crescent mine tramway in Utah the engine works on one grade of 549 ft. per mile, and many other instances can be given of successful working on very heavy grades.

The engine is made of various sizes from 10 to 80 tons total weight, all of which is available for adhesion. Three cylinders are used, with cranks at 120 degrees with each other. For the heavier classes there are three sets of trucks and for the lighter two sets. These trucks are all four-wheel, swivel, with all axles driven by bevel gears mounted on a longitudinal shaft running along the right hand side of the engine and revolved by the three cylinders, which are placed on the right side of the engine just in front of the cab, as shown. The steam is taken from the dome by a single steam pipe and delivered to the steam chests as shown. There are three separate exhaust pipes leading to the smoke arch.

The flexibility of the engines on curves is provided for by an expansion, universal coupling in the longitudinal

shaft. It is claimed that these engines work easily on a curve of 50 ft. radius.

Up to this time 350 of these machines have been built by the Lima Machine Co. One 8-ton and one 15-ton are used by the Gilpin Forwarding Co., at Black Hawk, Colo.; one 14 and one 20 ton by William Allen, Republic, Mich.; one by the Malvern Lumber Co., Malvern, Ark.; one 28-ton by the Salt Lake & Fort Douglas R. R.; one 80-ton by the Montana Union Ry. Co., and others of various weights in different places.

The engine for the Montana Union which is illustrated is one of the largest of the type ever built. The following are the general dimensions:

Cylinders, three, each 16 in. diam. × 15 in. stroke.
Driving trucks, three, swivel, with 40-in. wheels, all drivers.
Wheel base of trucks, 56 in.
Centre to centre of front and middle trucks, 25 ft. 10 in.
Centre to centre of middle and rear trucks, 12 ft.
Total spread of trucks, 37 ft. 10 in.
Tank capacity, 2,500 gallons.
Coal capacity, 4 tons.
Boiler, 52 in. diam., wagon top, with crown bars, ½-in. steel plates.
Tubes, 181, 12 ft. long, 2 in. diam. outside.
Firebox, 77 in. long × 49⅝ in. wide, 60 in. deep above grates
Frames of 12-in. steel channels, in two sections, connected by flexible joint between tender and engine.
Steam pipes, 6 in. diam. inside.
Crank shaft journals, 5¾ in. diam. × 11 in. long.
Brakes, steam brakes for driving trucks and Westinghouse for train.
Truck wheels, 40 in. diam., with steel tires × 3½ in. × 5⅝ in.
Truck axle journals, 6 in. diam. × 7 in. long.
Truck bolsters of 12 in. steel channels.
Truck springs, 30 double coil for each truck.

The cylinder and pillow blocks are cast in one piece of cast iron, fastened to the boiler above and to the 12-in. channel iron engine frames below, allowance being made for the necessary expansion. The steel gear rims for the truck wheels are secured to the wheels by turned steel bolts. These rims have 37 teeth, 2¼ in. pitch and 7 in. face. The pinions have 18 teeth, and are pressed on to the steel longitudinal shaft, which is $4\frac{5}{32}$ in. diam., and are keyed thereon. The longitudinal shaft journals are $12\frac{9}{16}$ in. long, and run in brass bearings, with brass collar for receiving the end thrust. The shaft couplings are of steel with a taper fit on shaft; they are keyed in position.

The truck axle boxes are made adjustable to provide for the alignment of the pinions as the axles wear. Each truck is equalized on the side which is not driven in order to prevent the springing of the truck frames. The axle boxes on the driven side are made of cast steel.

Some of the advantages claimed for this engine are: Shortest possible rigid wheel base; more uniform distribution of total weight over long wheel base, thus permitting the use of a powerful locomotive on a light rail; sufficient flexibility of wheel base on curves of the shortest wheel base that an ordinary freight car can pass; utilization of entire weight of engine for adhesion and decreased cost of hauling at low speeds on heavy grades and sharp curves.

Semaphore Lamps Showing Green for "All Clear."

The drawings shown herewith illustrate a system of signal lamps in use in several interlocking plants on the Chicago & Northwestern, and designed by Mr. Edward C. Carter, Principal Assistant Engineer of that road,

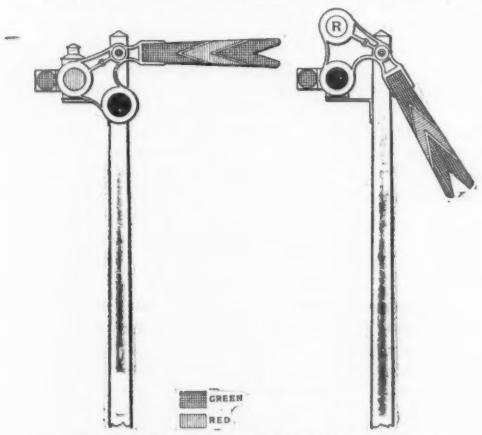


Fig. 1.—Distant Signal, C. & N. W. Railway.

with a view to eliminating the dangers and inconveniences incident to the use of white lights for clear signals, and also to make the semaphore lights of the road consistent with the common switch lights, which show green for the main track.

Fig. 1 shows the "on" and "off" positions of the distant signal, the first being a green and a red light side by side, and the other a green light alone, the spectacle casting being so arranged that when the arm is pulled down it lifts the red glass from its position in front of the lamp and brings up a sheet-iron disc in its place, covering the white light. The red and green glasses are indicated in figs. 2 and 3 in the same way as in fig. 1.

Fig. 2 shows the two positions of the home signal, and needs no explanation. Fig. 3 shows a home signal post with an illuminated blade for an inferior diverging route, a facing point crossover or a side track. In all the cuts the glasses which are out of position or not in use are indicated by letters—*G* for green and *R* for red.

Fig. 4 shows a plan and a front elevation of the lamp used in the distant signal, arranged with reflectors so that one flame lights both the red and the green portions of the signal.

The dangers attendant upon the use of white lights for clear signals are, first, white lights are so common that should a signal light go out there is a possibity of a light

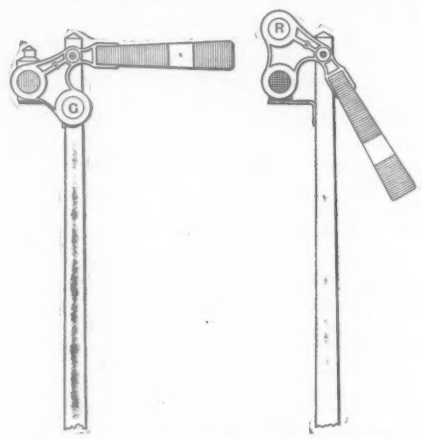


Fig. 2.—Home Signal, C. & N. W. Rai way.

in a house about on the line of the signal being mistaken for the signal light; second, the red glass may be broken or jarred out of the spectacle; and third, the spectacle casting may itself break off. In either case a false indi-

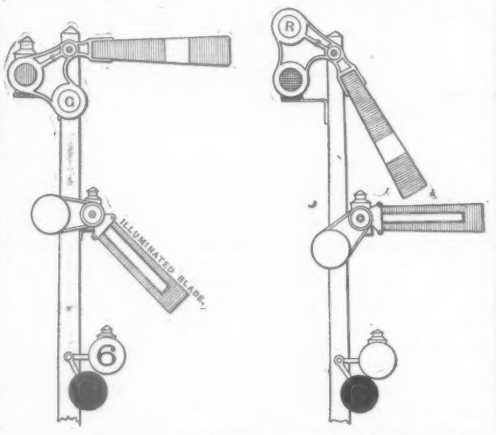


Fig. 3.—Home Signal with Indicators, C. & N. W. Railway.

cation is possible, whereas by the use of a color for the clear signal the failure will be at once detected.

The distant signal is, of course, the place where one first meets with difficulty in attempting to devise a

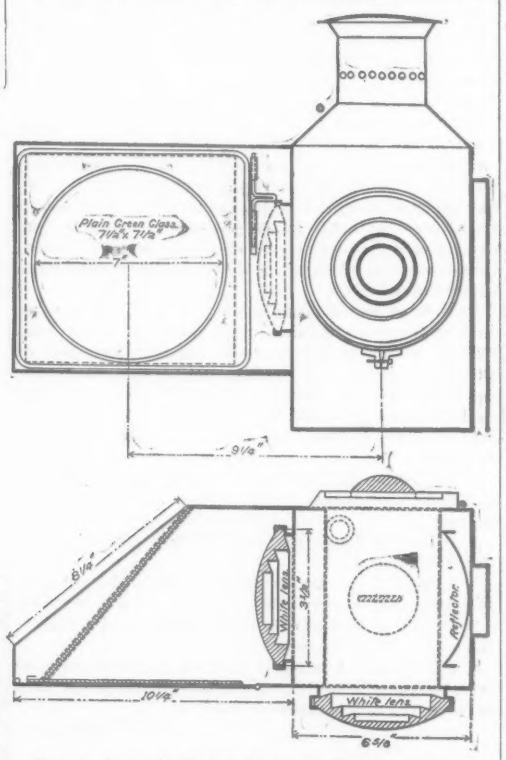


Fig. 4.—Lamp for Distant Signal, C. & N. W. Railway.

system using only two colors, red and green, to give indications. It will be seen that caution is here indicated by a combination of red and green lights. In answer to the criticism that red is used in an illogical manner, it is said that in practice no difficulty or complaint arises. The red is made more prominent than the green so as to err on the side of excessive caution, if at all; and an engineer approaching a signal of this kind, and coming in sight of it at a distance of a mile or more, sees only a red light; but as he comes nearer, say within half a mile of the signal, the green comes into view and gives him a definite idea of the true meaning of the signal. Where a signal is located on a curve and comes into view only when the runner has approached close to it, he of course discerns the distinctive signal at once. No delay is occasioned in either case, as a distant signal apparently showing red alone never comes into a runner's view except when he is so far away that he need not slacken speed for it. He is placed on his guard and watches the signal the same as if it were a home signal, but before he gets near enough to necessitate shutting off steam he sees the green, and knows that it is a caution, and not a positive signal.

Interchange Rules—New York Railroad Club.

At the regular meeting of the N. Y. Railroad club, April 16, the special order of the meeting was a discussion of the Rules of Interchange of Freight Cars. The following members of the New England Railroad Club were present, and were, by vote of the club, requested to take part in the discussion and voting, viz.: F. D. Adams, J. W. Marden, J. N. Lauder and J. T. Chamberlin.

The rules were read by sections and acted upon as read. The following changes were recommended:

Rule 3, section (*a*), changed to read, "Unless the spots are over 2½ in. in diameter," instead of "length," as formerly.

Section (*b*) changed to read, "Seams 3 in. long or over at a distance of ½ in., etc.," "or Seams 5 or more inches long, etc."

Section (*c*) to read "Worn tread, when the spot caused by wear exceeds 4 in. in length, etc."

Section (*d*) to read "Worn flange, flanges 1 in. thick or less, etc."

Condition No. 11, Section (*s*) to read "Brakeshoes secured to brakehead by either key-bolt, bolt and nut, or key, as required by form of head. Brakeshoes worn to ⅝-in. at the centre shall be considered as worn out, and may be replaced with new shoes, at the expense of the company owning the car."

Section (*u*). A new condition was recommended, to be Condition 9, viz., that "Any defect in the M. C. B. type of coupler shall be accepted, provided that it does not interfere with the effectiveness of the coupler."

Another condition was recommended as condition 10, viz.: "In the absence of any stencil on cars equipped with cast-iron drawbars showing what is the proper standard, any drawbar of the length or dimensions shall be accepted."

A new rule was substituted for No. 4, as follows: A car with new defects which do not render it unsafe to run or unsafe to trainmen must be accepted, but in such cases the company to whom such car is offered may require that a defect card shall be securely attached to the car with four (4) tacks, preferably on the outside face of intermediate sill, between tie timbers; but no defect card shall be required for old defects on foreign cars by the receiving road. Companies shall only be required to card their own cars for old defects.

Rule 5 was amended to provide that defect cards shall be filled in on both sides with ink, and a pen be drawn through the blank lines.

Rule 7 was amended by omitting the last four words.

Rule 9, Section (*c*), was amended to read "Worn tread."

Rule 10 amended by the addition of the following clause: "Cars belonging to private companies having drawbars broken shall be delivered by one company to another without being carded for wrong drawbars, provided that the broken drawbar has been replaced by a bar of proper dimensions, same as is in use on the different lines over which the said private cars may be run."

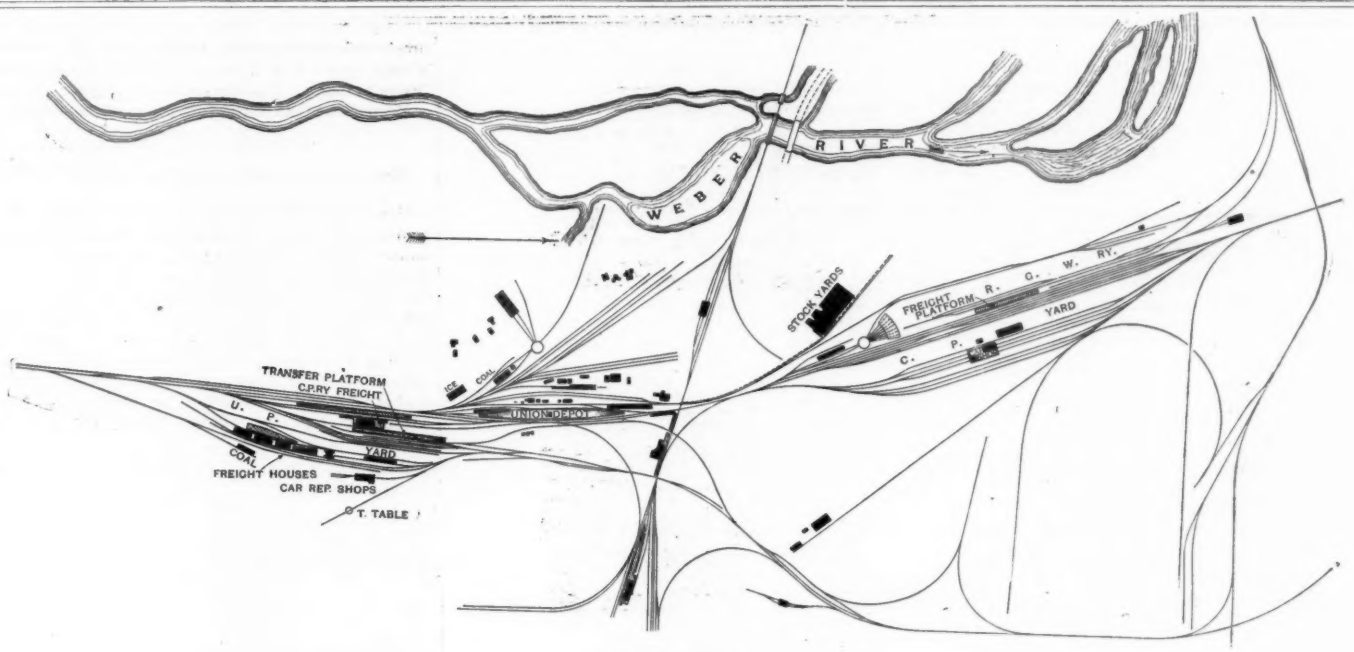
Rule 18 was amended to allow that two adjacent sills may be spliced (provided that both splices are not within 12 in. of the body bolster), if one splice is made between the body bolster and end sill and the other splice between the two body bolsters.

Rule 21 amended providing that a penalty of 25 cents per day be charged against the railroad destroying the car and failing to give notice to the owners within 30 days.

It was voted to recommend to the committee having in charge the matter of painting and lettering cars that the initials and number of the car be stenciled on the inside or outside of the door.

The Harvey Steel Car.

The Harvey Steel Car Works, in the town of Harvey, 20 miles south of Chicago, are now in running order, and 25 cars are being rapidly completed. The works are situated not far from the Illinois Central station and are built on a plan which permits of ready extension as business increases. Last Saturday a party of railroad men and engineers visited the works to examine the cars which are under construction. The machinery is all new and adapted to car work. However, much machinery must be added before the works will have the facilities they need to compete with wooden construction. The tools most needed are power riveters. These will be added immediately. In these shops the bulldozer is used for all it is worth, and that is considerable. The output of this machine, as here operated, is something enormous. It is run in connection with a very ingenious oil furnace for heating the parts to be bent. As might be supposed, drilling machinery is in preponderance,



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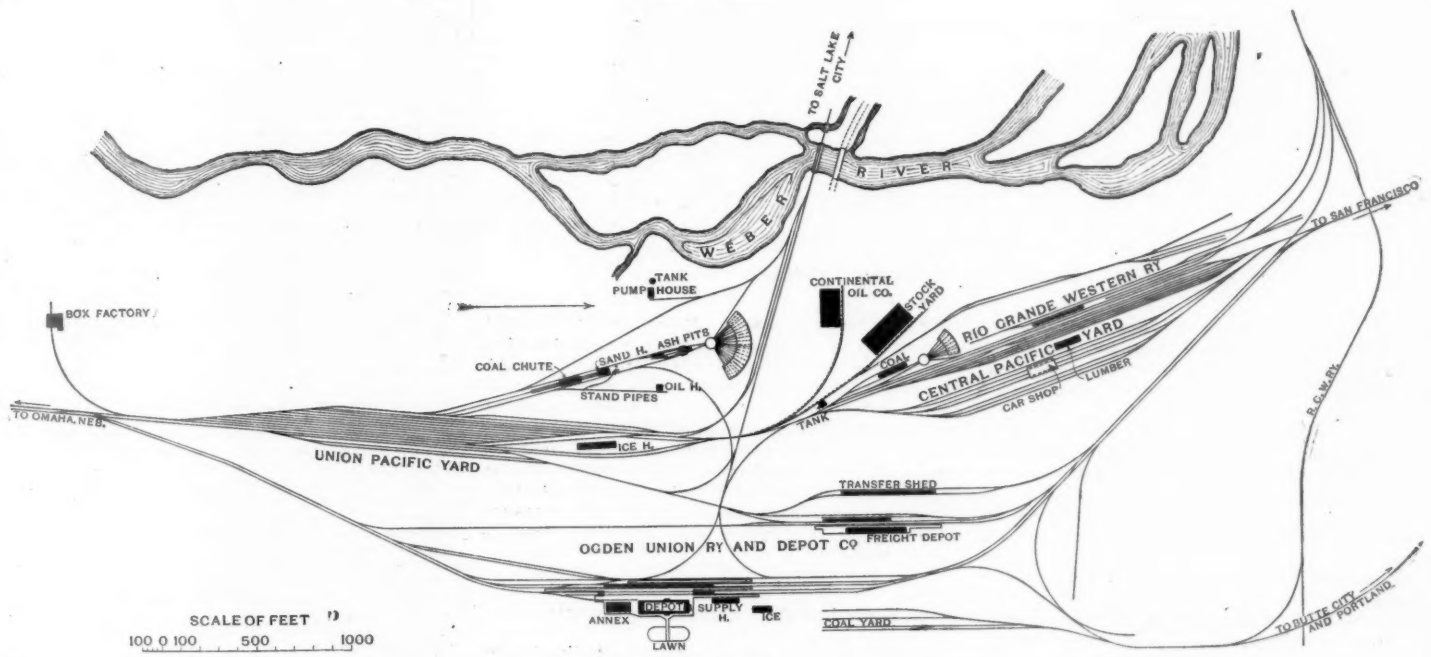


After Revision.

OGDEN SWITCHING YARDS—UNION PACIFIC RAILWAY.

there being but little finished work on the present design of cars.

The car itself is probably the most advanced design of steel car that has been built in this country. It is made entirely of rolled shapes, somewhat as follows: The two centre sills are formed of 12-in. channels, to which the draft rigging is directly attached, forming at once a continuous drawbar and a draft rigging of such strength that it cannot be injured by any blow which a drawbar can withstand. All breakages with this arrangement will occur in the drawbar itself, and not in the draft rigging. The intermediate and side sills are made double, being formed of 6-in. channels placed side by side; thus each sill is double, the object being to give a greater resistance to end thrust. The floor is attached by nailing, as usual, to cleats which are bolted to the sills, the bolts for the cleats passing down between the two channels. The sides of the cars are formed of pressed-steel stakes about ⅛ of an inch in thickness, formed in the bulldozer. To one end a strap bolt is riveted, which passes down between the double sills with a nut below; this secures the stake to the sides.

This company is also making an iron truck for purchasers who have no standard truck of their own. This truck is made with all the modern improvements, and is one of the simplest iron trucks we have seen. It has a carrying capacity for 60,000-lb. cars.

It becomes evident from an examination of these works, and a knowledge of the designs and intentions of Mr. George L. Harvey, the inventor of the car, and Mechanical Engineer of the company, that the outcome of this project will be a satisfactory steel car; that is, one which will be lighter, stronger and more durable than the present wooden ones, and which will cost about the same to build. The first two cars constructed for this company were built at the Aurora shops of the C., B. & Q. The experience gained with those has been fully considered in the new designs, and the present construction is a great improvement over the first. Necessarily, a desirable steel car will be obtained only by actual development, and the start which these works now have ahead of other builders, and the progressive methods which they follow, will lead them to the desired end before they will be greatly affected by competition.

Aside from strictly steel freight car building, these works can do a large variety of general metal car work, such as derrick cars, ditchers, locomotive tenders and cabooses, of which there are in the vicinity of Chicago enough to keep them occupied to their full present capacity. Orders are now in from the C., B. & Q., L. S. & M. S., C., M. & St. P. and others. The Illinois Steel Co. will use these cars for all coke transportation. The new cars have the National hollow brake-beam, the Griffen wheel and the Safford link drawbar.

Switching Yards at Ogden, Utah.

Three year ago the yards at Ogden were about as chaotic a mess of tracks as could be found in a long journey. When the Utah Central and the Utah Northern Railroads were taken into the Union Pacific System, it was decided to build a union passenger station and improve the switching yards. A handsome and commodious passenger station was built on lands owned by the companies interested, and this station is now used by the Union Pacific, the Southern Pacific and the Rio Grande Western. A local freight station was also built for the use of the two Pacific roads. These buildings were designed by Van Brunt & Howe, Architects, of Kansas City.

During 1890 the Union Pacific constructed a 20-stall round house, with a 60-ft. iron turn-table, a 40-pocket coal chute, a double ash pit, a brick oil house and an extensive switching yard. The round house is of brick with a flat roof; it is 79½ ft. deep, with an inside radius of 135 ft. The ash pit has a depressed track for loading cinders placed 5 ft. below the adjoining tracks. The new yard is arranged so that extensions can be built in the form of a "fish tail" yard. Water for the depots and round house is obtained from the Weber river, and pumped into a high tank from which a convenient pipe system supplies the various buildings, stand pipes and hydrants. The depots are lighted by electricity, and, what is something of a novelty, all the switch lamps in the passenger yard are also lighted by incandescent electric lights.

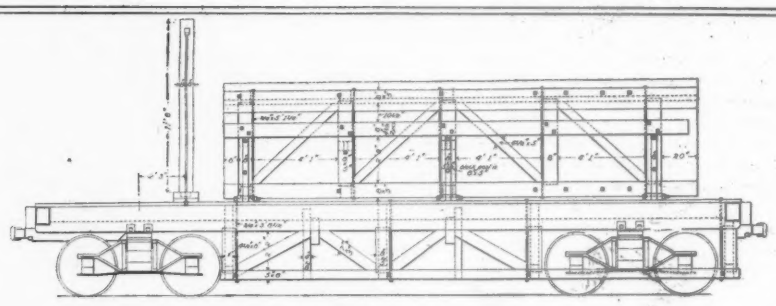
The round house, coal chute, yard, etc., were planned and built by Mr. T. Appleton, then Engineer of Buildings of the Union Pacific.

Columbia Railway & Navigation Co.

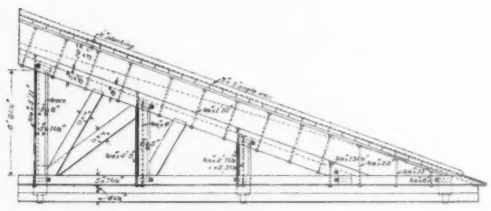
This company is building a portage railroad from Columbus on the north bank of the Columbia River, in Klickitat County, Wash., to a point near the mouth of the Klickitat River. The object of the line is to avoid the obstruction to steamboat navigation formed by The Dalles of the Columbia River and Hell Gate Cañon, a few miles east of The Dalles. The road will be 21 miles long, extending from a point a few miles above the obstructions to a point three miles below them. The road under construction is standard gauge, with light curves and gradings, the maximum curve being eight degrees and the maximum grade about 40 ft. per mile. The cost of constructing the road will be about $1,000,000.

By overcoming the obstruction to traffic on the Columbia River at this point a new steamboat transportation line will be opened from the Snake River to Portland. The company which proposes to build the portage road was formerly called the Farmers' Railway, Navigation & Steamboat Portage Co., and later the Farmers' Transportation Co. A new charter was granted in the State of Washington in 1890.

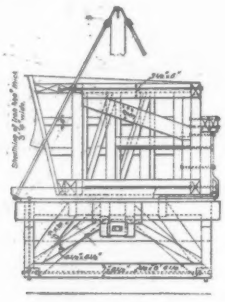
Between the termini of the road, and for some distance above and below, the Columbia River lies in a deep cañon, the walls of which are composed of black basalt and rise in terraces to a height of over 3,000 ft. to the crest of the Cascade Mountains. These terraces are each from 200 to 300 ft. high, and are composed of almost ver-



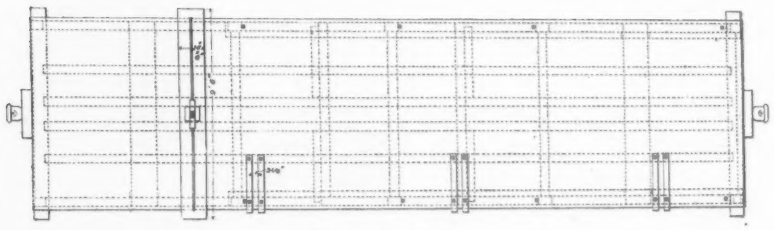
Side Elevation.



Inverted Plan of Scraper.



End Elevation.



Floor Plan of Car.

BOUTET'S BALLAST SCRAPER AND LEVELER.

tical walls of basalt, with narrow strips of almost level ground between the successive tiers of rock. The railroad is located at the base of the lowest of these walls of basalt, and in many places the roadbed, so far as it has been completed, has been blasted into the sides of the rock. An idea of the difficulties of construction may be formed, writes an officer, from the fact that within three miles over $400,000 was expended in blasting out the roadbed About 10 miles of the line has been graded, including the heaviest rock work. About four miles of the remaining 11 miles is fairly heavy rock work, and the balance is over comparatively easy ground. Four miles of track has been laid, and work is now in progress on the grading on the last 11 miles. There will be one tunnel about 250 ft. long through a sharp point of rock, and one bridge about 400 ft. in length, across a small tributary of the Columbia River, about midway between the termini of the road. The total sum thus far expended upon this work is about $500.000. The company expects to have the entire work completed by the time the United States Government completes the locks at the cascades of the Columbia River, in about a year and a half.

The total cost of this portage railroad, and of the steamers to handle the traffic now in sight, with the necessary facilities for transferring the cargoes, will be between $2,000,000 and $3,000,000. With this investment the company claims that it can compete under favorable conditions with the Oregon Railway & Navigation Company's line on the south side of the Columbia River. For the present it is intended to navigate the Columbia from Columbus (the eastern terminus of the road) up to the Okanogan River and up Snake River to a point 12 miles south of Lewiston and from the western terminus of the portage road to Portland and Astoria and up the Willamette River to Salem, comprising in all about 800 miles of navigation.

The officers believe that the traffic will be very heavy from the start. The products, especially cereals, of Eastern Oregon and Washington, which exceeded one million tons last year, promise, they state, to be considerably greater this year. A heavy traffic in ores, coal, lumber, and other products tributary to the Columbia and Snake rivers above and below the line can be counted upon. The company claims that the portage road will practically control the navigation of the Columbia and Snake rivers and their tributaries, and by reason of the exceedingly difficult topographical features of the country it will be impossible to parallel it on the north side of the Columbia River. On the south side of the river the line of the Oregon Railway & Navigation Co., is built over equally difficult ground.

During the last session of the Oregon legislature an appropriation was granted for building a temporary portage around the Cascades of the Columbia River (located about 40 miles below The Dalles), to be used until the government locks shall be finished, and the money will be expended immediately for that purpose. This temporary portage will be three-quarters of a mile long, and will cost about $100,000. With this in view, this company may decide to complete its portage road immediately and to place steamers upon the Columbia River east and west of the termini of the portage. Up to this time no bonds have been issued by the company, and it has no outstanding obligations. It is, however, intended, within a short time, to issue $1,000,000 of bonds to carry on the work. This will depend somewhat upon the speed with which the State of Oregon expends the appropriation already made for constructing the temporary portage at the Cascades. A. M. Cannon is the President of the Company, and Paul F. Mohr, of Tacoma, Wash., is Vice-President.

Boutet's Ballast Scraper and Leveler.

The engravings show a device for spreading ballast which was patented some three years ago by Mr. Henry Boutet, Joint Car Inspector of Cincinnati Railways, Cincinnati, O. The drawings show the scraper as in place for transportation on its car and not as in use. The flat car which carries the scraper is thoroughly stiffened, as will be seen, to take the strains brought upon it when the scraper is in use. The scraper is attached by substantial hinges to the floor of the flat car, and when it is used for spreading ballast is simply swung down into position alongside the car. It can be constructed to stand at any desired angle with the car.

The whole construction of the scraper and flat car is clearly shown in the engravings, as well as the dimensions of the various parts. Therefore, it requires no further description. This apparatus has been considerably used for two years or so on railroads centering in Cincinnati, and we have before us letters from several officers of those railroads speaking very highly of its performance. Mr. Greene, General Manager of the C., C., C. & St. L., states that it has been in use for two years on the Chicago Division of that system, and is said by the Engineer of Maintenance of Way to be the best machine for the purpose that he ever saw. Mr. Morris, Engineer of Maintenance of Way of the Big Four, estimates a saving of about $50,000 in the use of the scraper in the few months that he had used it at the time of his writing. The General Superintendent and the Chief Engineer of the Cincinnati, New Orleans & Texas Pacific speak of it as having demonstrated its practicability, usefulness and economy in making side fillings, and in connection with the steam shovel and plow unloader in filling trestles, etc. It quickly frees the track from newly unloaded material, making it practicable to keep a bank from 6 to 15 ft. from the track. It enables ballast trains to make quick trips between regular trains, that could not be made without the help of the scraper.

Ballasted Culverts, Southern Pacific Railroad.

The illustration shows a standard design for ballasted culverts on the Southern Pacific Railroad, Atlantic system, for which we are indebted to Mr. J. Kruttschnitt, General Manager. The engravings show the construction and dimensions in such detail that no description is necessary. For culverts having two bents in the opening the caps used are 13 ft. long, and the flooring is composed of 13 pieces of 10 in. × 12 in. stuff, instead of 12, as shown in the engraving. Creosoted timber is used for constructing these culverts on the Atlantic system, and following is the bill of timber for the culverts shown:

8 pieces	12 in. × 12 in. —	Piles (length to suit location).
2 "	3 in. × 12 in. × 14 ft.	Bulkhead.
2 "	3 in. × 12 in. × 17 ft.	
2 "	3 in. × 12 in. × 20 ft.	
2 "	3 in. × 12 in. × 23 ft.	
2 "	12 in. × 12 in. × 12 ft.	caps.
2 "	4 in. × 6 in. × 16 ft.	coping.
12 "	10 in. × 12 in. × 16 ft.	stringers.
10 "	6 in. × 8 in. × 8 ft. or 9 ft.	ties.

Locomotive Side Rods.

At the April meeting of the Southern & Southwestern Railway Club Mr. W. J. Hemphill, Superintendent of Motive Power, read a paper on the above subject. He said in part:

"My experience has been almost entirely with the rectangular section of main rod and with wrought iron as the material. I believe good hammered iron to be without a superior as a material for either connecting or parallel rod, although steel is coming into use quite rapidly. . . . The strap connection on the back end of the main rod seems to be the popular form. Compared with the fork plan in use on some roads, I think it is at least easier to handle and fully as cheap to make and maintain. . . . In the front end or wrist connection I believe a solid-end bearing could be run with economy. We have two switching engines in which we have wrought-iron bearings and wrist pin; both bearings and wrist pin are case-hardened, and one engine has made a mileage of 36,000 miles without the 'brasses in front end of main rod being filed.'" . . .

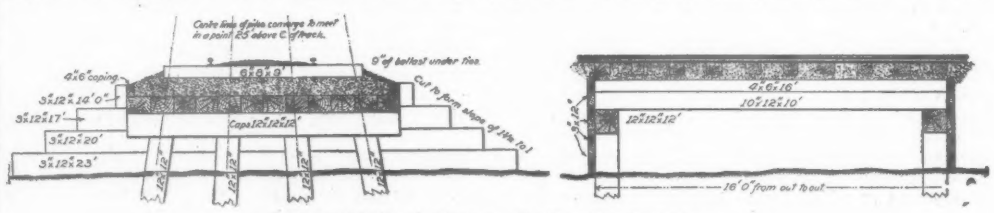
In reference to parallel rods with solid ends and those with straps, bolts and keys, my experience has been such that I am most heartily in favor of the solid end. We have one engine that has made a mileage of 102,433 miles without the cost of one cent for repairs, and the brasses are only worn out $\frac{3}{64}$ in. larger than the pin. In this case the composition of the brass is six of copper to one of tin, and the pins are wrought iron case-hardened. I do not believe it possible to run parallel rods with straps, bolts and keys and attain the same result. Not only is the maintenance much cheaper, but the first cost of making a solid-ended rod is less than the rod with straps, bolts and keys. I have endeavored to learn of a solid-ended rod breaking, but thus far have not heard of a case.

To avoid unequal keying we have for the past year put up the parallel rods without any keys, using solid liners and fitting them so that the bolts would draw the brasses, liners and strap solid against the stub end. This way of putting up the parallel rods insures no unequal keying, at least, but is not as satisfactory as the solid-ended rod. . . .

We secure our bushings in two ways—one by a dowel screwed in the top, which secures the bushing, and is also used to hold the oil cup; the other method is by a taper-pin that is fitted through the rod end, engaging the bushing to a depth of about $\frac{3}{16}$ of an inch. This method has not proven altogether satisfactory, and I am of the opinion that the dowel is the best manner of securing the bushing.

Both methods above given are of use where the bushing is pressed in. There are other methods of putting in and securing bushing, but I have given what I consider the best practice.

Mr. PULASKI LEEDS: While, as I have said, my preference in side rods is for the I-section swelling toward the center vertically, and crucible steel as the best material, still I consider the proper application and care of side rods as of more consequence, for I am confident that more pins, straps and rods are broken by being too tight and of improper length than any other cause. I believe in the rod without keys, as a protection against injurious meddling by incompetent persons. You will



Ballasted Culverts—Southern Pacific—Atlantic System.

probably have noticed that where cracked and broken straps begin to appear they become almost epidemic. This, I believe, comes from improper understanding of the conditions surrounding the use of a side rod and an indiscriminate reducing of brasses. . . .

While the solid rod does away with improper manipulation, the fact remains that no matter what their construction, if rods are properly applied, they will run all right; otherwise they will be over-strained. . . .

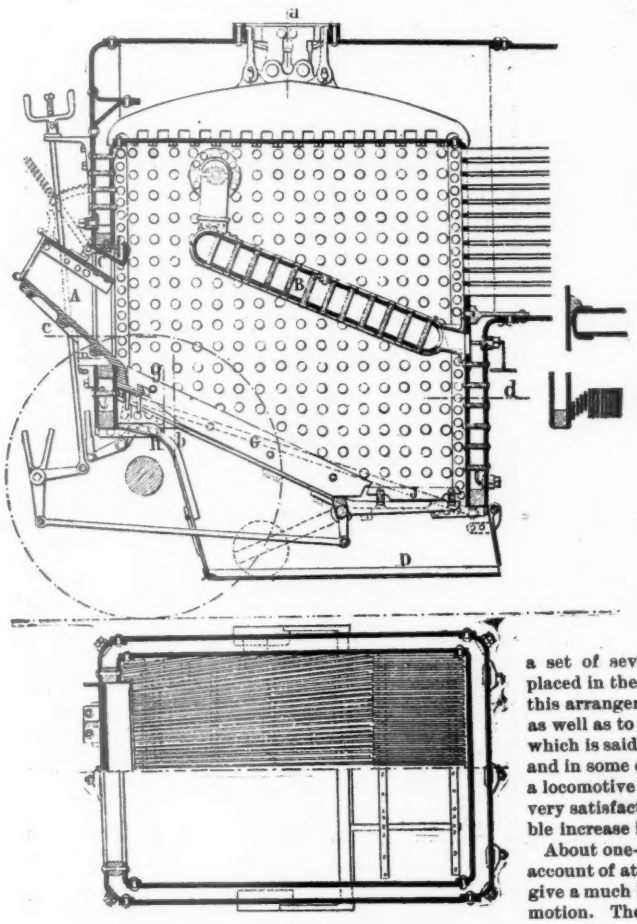
My practice for many years has been to make the main side-rod bearing as tight as it would run cool; then to make the other bearings slightly oblong in the brass, putting them up just as long as I could between the pins and one-thirty-second open on the side farthest away from the main pin. This is for the second rod either way from main pin. Where there was a second rod either way from the main pin, this one-thirty-second is made a scant sixteenth. I have in this way made a smooth-working engine out of one bitterly complained of by the engineer, and have converted and convinced

many a one that a loose bearing in the back end made no pounding, but, on the other hand, reduced it; also that it reduced the probability of his most vivid recollection of the "patter of the slipper" being outdone. In my opinion a side rod cannot be too long and run cool, and it is my belief that its being loose at extremes from the main bearing never injured either rod or pin, while the opposite practice has resulted in the stripping of many an engine.

Tests of Fuel Saving Devices on French Locomotives.

In a paper before the Société des Ingénieurs Civils, in June, 1890, Messrs. Lencauchez and Durant gave an account of tests on the Orléans railroad of several devices intended to render locomotives more efficient. These trials included a fire-box with a water-table, a feed water heater, steam jackets, an arrangement for delivering dry steam to the cylinders, and improved valve gears.

The peculiarities of the fire-box which was used, and which is known as the Ten Brinck fire box, are clearly shown by the accompanying illustrations. Referring to the figures, the water table *B* is of copper and is connected to the water space of the boiler by four pipes which are cast from copper alloyed with phosphorus.



Ten Brinck Firebox—Orleans Railroad.

The joints between the water-table and the fire-box are made with a mixture of fire-clay and ground fire-brick on the sides, and with fire-brick of special form at the lower end of the water-table. Coal is supplied through a hopper which extends nearly the full width of the furnace. The inclined part of the grate *G* is fixed, while the horizontal part forms a drop door. Air for completing the combustion of the gases is admitted above the fire by means of a valve *C*.

The results obtained with this fire-box on a trial with a locomotive having 18 sq. ft. of grate surface and 1,603 sq. ft. total heating surface, using *briquettes*, were 97 lbs. of coal per square foot of grate per hour and an evaporation of 9 lbs. of water per pound of coal. The Orleans Railroad has 636 passenger locomotives fitted with this fire-box and 579 freight locomocives fitted with the water-table, but having an ordinary furnace door with deflector in place of the hopper. The latter arrangement is not as good a smoke preventer as the former, and there is difficulty in keeping the upper corners of the grate covered. It is said that with the Ten Brinck fire-box, as illustrated, there is absolutely no smoke formed even with coal containing a high percentage of volatile matter. The life of the water-table is said to be from 10 to 15 years.

The next apparatus described in the paper is a feed-water heater, the operation of which is as follows: A part of the exhaust steam is led by a branch from the exhaust pipe to a grease extractor placed on top of the boiler. Thence the steam flows into a feed-water heater, which is apparently about as large as the steam dome, and which contains pans and plates arranged similarly to those used in some forms of heaters for stationary boilers. Here it comes in contact with the cold feed-water, which is supplied by a pump. A second pump draws the heated water, at a temperature of about 207° F., from the heater and delivers it to the boiler. The greasy water which collects in the grease extractor is led by a pipe to the ashpit. The saving by the use of this heater is figured at 15 per cent. It is in use on 17 freight locomotives of the Orléans Railroad, but is considered too complicated for passenger engines.

The proposed system of steam jackets includes a circulation of steam in the jackets independent of the steam supplied to the cylinders, to accomplish which a draining pump and an injector are used in combination with the feed pumps previously mentioned. The results of the trials appear to have been unsatisfactory on account of difficulty with the pumps at high speed, and in keeping the jackets tight, but the authors are of the opinion that a saving of 4 per cent. may be obtained with perfected apparatus.

The arrangement for drying and superheating the steam, which is described in this paper, operates as follows: The steam pressure is maintained in the boiler at 227 lbs. per sq. in. This is reduced by a pressure-reducing valve, which is placed close to the steam dome, and hence near the throttle valve, to from 140 to 170 lbs. The steam then passes, on its way to the cylinders, through a set of seven tubes about 2 in. in diameter, which are placed in the steam space of the boiler. The object of this arrangement is to increase the power of the engines, as well as to diminish the amount of entrained water, which is said by the authors to be ordinarily 15 per cent., and in some cases from 20 to 25 per cent. It is said that a locomotive fitted with this device has been working very satisfactorily for three months, and shows a notable increase in power.

About one-half of the paper is devoted to a detailed account of attempts to develop a valve gear which would give a much better distribution than the ordinary link motion. The idea which is followed throughout is the separation of the steam and exhaust valves. The various methods which were tried are illustrated in the paper and detailed tables of the distribution are given. The most notable are the following: First, steam slide valve operated by a Gooch link motion and exhaust slide valve operated from the crosshead; second, steam as above and Corliss exhaust valves driven from the crosshead; third, four valves of the Corliss type, the steam and exhaust valves being driven by separate link blocks in the same Gooch link. The last is the form finally adopted, and gives a much better diagram than the ordinary link motion, as shown by the illustrations with the paper, with greatly reduced clearance space.

The authors say in conclusion that a carefully built locomotive gives an effective horse-power, at the driving axle, for 2.8 lbs. of coal of good quality or 23.4 lbs. of dry steam, which corresponds to 26.8 lbs. of water, or about the same as a first-class high speed non-condensing stationary engine, and about 24 per cent. more than a non-condensing Corliss engine. Also that for the same work an economy of 34 or 35 per cent. over the ordinary locomotive can be realized, or that for the same weight of coal burned on the same grate area it is possible to increase the power 35 per cent. In other words, taking the consumption of the ordinary locomotive at 100, 10 per cent. saved with the Ten Brinck fire-box reduces the consumption to 90; the feed water heater saves 15 per cent., which reduces the consumption to $90 \times .85 = 76.5$; 4.37 per cent. saved by steam jackets reduces this to 72.1; and a four-valve distribution will save 10 per cent. more, as figured from the diagrams, which leaves 64.8 as the relative consumption of the "perfected" engine.

The authors are evidently opposed to compound locomotives, and among other objections to them raise the question of complication and consequent increased cost, etc., which statement can hardly be said to gain force by repetition in connection with the descriptions of the various devices which form the subject of this paper.

Vertical Plane Couplers.

At the March meeting of the Southern & Southwestern Railway Club Mr. Pulaski Leeds spoke as follows on the M. C. B. coupler:

While I think there is some reason in the stand taken by the New England Club, I cannot indorse a full condemnation of the M. C. B. type unless something better is offered. I consider the applying of these coupiers to a portion of our equipment only as both expensive and dangerous; such practice is expensive, in that the common drawbar, and especially the Safford, is calculated to destroy them; and more especially are they expensive if, in case of a knuckle breaking, we try to run them with a link connection, the destruction of the drawbar being almost assured under these conditions.

I think the M. C. B. coupler must be improved in two directions: First, by making it entirely automatic, so that when unlocked it should open and not necessitate a man going in between the cars to set them. Second, with the unlocking levers, as now applied, the operator has to pull fore and aft the car, and, in case of the lock or its connections working so hard as to prevent a man from raising the lever at arm's length his body naturally gravitates to a position between the cars, while he is stumbling along over the end of ties; now, if these levers were arranged so that the pull was across the end of car and at right angles with the length of the car body, the switchman would naturally throw himself from the car and track as he pulled at one that chanced to work hard. In that position his life would be safe, while in the other it is not.

Some provision should also be made for lessening the danger in case of draft rigging pulling out. At present there is a certainty of the coupler falling on the track in such cases and passing under the trucks, stripping brakes and connections and endangering sand boards, even if no derailment ensues. Again, they are more dangerous to trainmen when used in connection with the old-time drawbar than they (the old drawbars) even were; thus, if the change is to be made, it should be universal and should be made as quickly as possible.

The L. & N. has had offers from coupler companies whereby they agree, in consideration of our putting on a certain number of their couplers, to furnish parts to replace those broken at $1 per year per car. As we have not adopted any particular coupler as yet, and have but few in use, I have not asked any questions as to the scope of this offer, whether this insurance follows the car wherever it is or not. Most assuredly if it does, it would be a great saving on what they are costing now; at the same time it will not be much of a guarantee unless it does. If the maintenance is to be kept up irrespective of where the car is, then the repairs could be made wherever the damage occurred, and by sending the broken parts to the manufacturer and the payment of $1 per year both roads would reap the full benefit of the guarantee; but if this is not so, then our protection is reduced to one-half, and decreases in proportion to mileage on the home road. It would be a good thing for the roads if they did have this arrangement, as it would protect them from those who are inclined to go to manufacturers of miscellaneous castings for their parts for repairs, where the price would be less than that at which they could be obtained from the coupler companies. There is one class it would not protect us from, those to whom I have before called attention, viz., those using common grey castings. The only defence against such is eternal vigilance. In conclusion, I think, in the absence of a better, the M. C. B. should be universally adopted, but it is too expensive and dangerous to be adopted partially, and the change should be as rapid as possible.

Western Railway Club.

The substance of the doings of this club at its April meeting is given below.

INTERCHANGE RULES.

The recommendations of the Western Railway Club as to alterations in the M. C. B. interchange rules finally stand as follows:

Rule 3.

To insert after the word "effective" in clause 7 of paragraph (*u*) of rule 3 the words "Draw timbers must be sound and free from cracks or splits which extend from the end to bolt hole or from one bolt hole to another."

To add to section (*y*) after the word "missing" the words "or broken, so as to render contents of cars liable to damage from sparks or storms."

To add to section (*z*) the words "light or loaded."

Rule 5.

To add after the word "specify" in the fifth line the words "without abbreviations."

Rule 6.

To add to Rule 6 the following: "In the event of repairing only a portion of the defects covered by the card, the parts so repaired shall be cancelled from the card, and in place of detaching the card from the car, as is now the custom, an abstract of this card shall be made to accompany the bill for the parts repaired."

To strike out from rule 6 the clause "provided such repairs are necessary for the safe running of the car."

Rule 9.

To alter the third paragraph from top of page 12 of Book of Rules, concerning changing of axles, to read as follows: "When axles are changed the axles applied shall be stamped or prick-punched near the center with the initials of the road applying them, together with the date of application, and they shall be charged to the company owning the car if the cause of removal is due to."

Rule 10.

To insert in Rule 10, after the word "design," the words "material or workmanship."

Rule 11.

To add after the word "decay" the words "or on account of roof blown off because of faulty construction."

Rule 17.

To insert in the fourth paragraph of Rule 17, between the words "with" and "date," the words "initials of the road applying them, the."

Rule 21.

To add to Rule 21 the following penalty clause: "In case the notice is not received within the limit above provided a charge of 25 cents per day shall be made."

Rule 22.

To add to Rule 22 the following penalty clause: "In case the rebuilding is not completed within the limit of time above provided, a charge of 25 cents per day shall be made."

Rule 23.

To make a revision of the prices of car bodies and trucks.

Rule 26.

To establish, in addition to the prices now given for material

as per rule 26, a fixed time charge for labor for the following standard repairs to freight cars:

	Hours.
For one draft sill	36
For two draft sills	42
For two intermed ate sills	30
For one intermediate and one draft sill	41
For two intermediate and two draft sills	47
For one intermediate sill	15
For one side or one intermediate sill spliced	18
For one end sill	12
For one draft timber	7
For two draft timbers	10
For one crosstie timber	5
For one endpost	6
For two endposts	8
For one corner or side post	5
For one swing bolster	5
For one swing plank	4
For one endplate	6
For one drawbar	1 to 2
For one doorstop side	1

Twe cents per square foot for all sheeting, lining and roofing.

One cent per square foot for flooring.

To add to the prices in the same rule the following:

"Three-quarters of a cent per square foot for paint and nails."

To make a general revision of prices in Rule 26.

To add to the paragraph in Rule 26, referring to manufactured articles (see p. 21), the following words: "Without any allowance for freight charges."

Rule 29.

To change Rule 29 to read as follows: "Any railroad company that does a general traffic business may become a party to the code of rules by giving notice through one of its general officers to the secretary of the Master Car-Builders' Association, and providing the application is approved by the Executive Committee.

Preface.

To insert the following preface in the Book of Rules:

"These rules are intended:

"1. To promote the safety of freight trains.

"2. To prevent unnecessary delay to freight cars.

"3. To locate the responsibility for damage to freight cars. and to provide an equitable basis of settlement for such damage."

In addition to the foregoing the club put itself on record to the effect that no roads should make bills on defect cards except where they have either made or paid for the repairs themselves.

INTERCHANGE AT CHICAGO.

After the consideration of the interchange rules Mr. P. H. Peck read the following notes:

I find there were delivered into the city 261,811 cars during the month of November, 1890, a daily average of 10,069 cars. There were transferred to other lines 146,212 cars, or a daily average of 5,623 cars.

Averaging the length of the cars from end to end of drawbar at 32 ft. per car, the daily average brought into the city is a fraction over 61 miles of cars. There were over 34 miles of cars transferred during the same time. There were 419 cars brought into the city and 234 transferred during every hour of the day.

There were 256 inspectors, 1,463 car repairers, and 27,979 cars repaired during November, 1890. Deducting the Belt, C. & C. Terminal and stockyard inspectors, we have left 210 men to inspect daily 10,069 cars, or about one man to 48 cars. Estimating the pay of the men at $50 per month, the cost is shown to be four cents per car for inspection alone, which sum I think is too much.

The daily average of cars repaired is 1,076, or 107 per hour, or 1¾ cars in every minute.

I asked for the number of drawbars broken, but most of the roads did not keep this record in 1890. The Belt broke one drawbar to every 273 cars handled (though this year, so far, we are breaking less); but taking that as a basis for calculating this, there are 36½ drawbars broken daily in our interchange.

The above figures do not include the repairs of cars actually broken in the city, as many of the car shops are located elsewhere.

In the same month, November, 1890, over 50 per cent. of the cars transferred by the Belt road were more or less defective. I have the reports of the number of cars that the Belt road has records against. The lowest per cent. received in defective condition is 20; the highest is 82 6-10 per cent., and if M. C. B. cards had been given for all defects in the month of November there would have been 2,888 cards issued daily. I think it would have been impossible to issue this number, especially under the present system of inspection. Cars would be detained too long and we would have extra switching and double inspection. This work could be done, however, under a system of joint inspection, controlled by one chief located in the city, the same as the car service association is worked at present. There would be some trouble and attention from the heads of car departments to get such an inspection system into shape, but I think it is well worthy of a trial at least.

After intermission, the club took up the discussion of Mr. Hickey's paper on improvements in

LOCOMOTIVE BOILER CONSTRUCTION.

President BARR: Has any one of you had any recent experience with iron in fireboxes?

Mr. W. H. LEWIS: About eighteen months ago I thought I would buy some iron side sheets. We have a great deal of trouble with our fireboxes. I do not think there is another road in the United States where the life of the fireboxes is so short. We have very heavy trains, averaging 32 cars to the train, and we have very long runs. My theory is that we generate a more intense heat by our long constant pull on heavy trains than it is possible to get up with ordinary trains. The life of our side-sheets wouldn't exceed eighteen months. I thought I would try a soft iron side-sheet and see what the difference would be, and I put in a set of them, five-sixteenths thick, and just as ductile as steel. It was as tough an iron as I ever saw. You could double it over without fracture. Yet, after one year that iron began to crack, just the same as the other sheets did, and after sixteen months the sheets were removed.

Mr. C. F. LAPE: I have also had a little experience with iron. After leaving copper and going back to steel we, on our road, had bad luck in the way of cracking, and I suggested that we would try Sligo iron, and we had some 10 or 12 boxes of it, with about the same results that Mr. Lewis speaks of. We then changed from Sligo to Tennessee. I put in some six or eight fireboxes of Tennessee iron, and it worked nicely for about a year or 15 months, and then it commenced to crack. In some cases it would not only crack but blister. I found the same trouble as with the Sligo. We used some Low Moor in two or three boxes, and after a few months it seemed to be as hard and liable to crack as steel. Then we went back to steel of different brands of the day. We got two fireboxes of Krupp steel and it did very well. But the price was pretty high, and another objection was that when you wanted it you couldn't get it.

Mr. FORSYTH: I think the circumstances that these two gentlemen have related can be accounted for. The iron under high temperature takes up a small portion of carbon. In other words, it becomes more highly carbonized, which is in effect to make it harder and really to make a steel out of it. The same thing takes place with a steel plate. If we start in a firebox with a steel plate that has a tensile strength of fifty or fifty-five thousand pounds, we will find in time that it has gained nearly ten thousand pounds. I have recently made a test showing this to be so. The steel has become more highly carbonized. Its strength has increased and its ductility reduced, making it more liable to crack, as you have found with your iron. I think this is a common tendency to be found with iron or steel, probably more frequently with iron.

I think Mr. Hickey has presented a very good design for a locomotive boiler in this plan which is attached to his paper. It will be found to be considerably heavier and more expensive than boilers which have been in use in years past, but the opinion is gaining ground that it pays to spend more money on a boiler for the benefits which we get in greater endurance, greater safety and less repairs. There are one or two points in the design which I think are unnecessarily expensive. One detail which I think could be arranged in a better way is in regard to the water-legs. I believe that a large portion of the trouble with leaky water-legs has been on account of not finishing the mud ring. You know how we have been in the habit of double-riveting the rings. I believe it would be just as cheap and just as good to finish these rings so as to get a fair contact of the sheets with the forging, and that then we would not be troubled with a leak. The other detail that I refer to is the longitudinal tie rods directly over the crownsheet. I think that the rods would sag down onto the crownsheet, and would in time cause an accumulation of mud, as they would prevent the circulation of the water from washing the sheet off as thoroughly as if they were not there. I notice there are about 10 of those rods directly over the crownsheet.

President BARR: We used to build all our boilers with those longitudinal rods, but we found it necessary to put cross-stays in about the center of the boiler to support them. We do not use the construction any longer.

Mr. LAPE: I agree with Mr. Forsyth in regard to the double seam of the mud ring. We make all our mud rings so that we can put them on the slotter and shave off the outside radius as well as the inside, and then bend the sheets according to the radius. We have very few mud-ring corners that leak, from the very fact that we are particular with them. I believe in making that corner on the inside of the ring just as sharp as you can. There is one thing in Mr. Hickey's boiler that I wish to refer to, and that is the radial stay. I was at one time opposed to it, but I am now much in favor of it.

Mr. PECK: We have engines built eight years ago with radial stays and there has never been a bit of repairs on those stays since they were built. I notice what Mr. Hickey says about shallow fireboxes. I have them and they do very nicely with clean, good coal, but with poor, dirty coal they don't—they will all stop up the bottom flues.

President BARR: My experience with radial stays has been very encouraging indeed.

Mr. FORSYTH: There is one little point about these radial-stay designs that should be noticed, and that is the expansion of the fluesheets going directly to the radial stay and throwing a strain on the circular sheet, which is already strained as far as it can go. That is one of the advantages of the Belpaire box—it will allow accommodation to this expansion, and thus obviate that difficulty in a very simple way.

President BARR: I would like to ask if there have been any attempts made with boilers running with very bad water to arrange the flues so as to reduce the trouble if possible—to provide washing-out facilities, and so on.

Mr. LAPE: I have built some boilers with flues in straight rows up and down, thinking that it would probably aid to get the mud out; but after running those boilers some six or eight months I could not see that it mattered much whether the flues were zigzag or straight. The mud would get in anyway.

The following subjects will come up for discussion at the May meeting: "Air Brakes in Interchange," "Car Heating."

The Transandine Railway Tunneling Plant.

In our issue of Oct. 17, 1890, was given a description of the system of tunnels under construction by Messrs. J. E. & M. Clark & Co. across the Andes to connect the lines from Santa Rosa, Chili, to Mendosa, Argentine Republic. We are indebted to *Engineering* for a further account of the plant used by Messrs. Clark & Co. in this difficult work.

The greater part of the tunneling is on the Chilian slope of the mountains. Beginning at Semcal the grade rises with a maximum of 8 per cent. till the summit level is reached at an elevation of 12,467 ft. above the sea. A spiral tunnel is introduced at Portillo, to over come the heavy grades at that point, having a radius of nearly 700 ft. The system comprises eight tunnels in all, of which seven are in sidelong ground admitting of openings being made so that a greater number of working faces are obtained, thus enabling the excavation to proceed much more rapidly than if worked only from the ends. The tunnels, which are for single track, aggregate 9.32 miles in length and have a sectional area of about 200 sq. ft., the height being 17.38 ft., width, 11.15 ft. and radius of arch 6.56 ft.

The boring is done by means of compressed air, and it is in the installation of this plant that the Messrs. Clark have overcome the greatest difficulty. Owing to the total absence of fuel and the enormous cost of transportation it was found necessary to make use of natural agencies, and to this end electrical power was selected for running air compressors. The line was divided into three sections, each of which was provided with an independent plant. All of these being uniform in general arrangement, it is necessary to describe only one.

Each plant consists of a primary and a secondary station. The primary station contains the turbines and dynamos, which are directly connected, thus avoiding all loss in transmission of power. Water is conveyed in 20 inch steel pipes from the settling tanks, a distance of, in one case, nearly a mile. The turbines, of the Girard type, are three in number, and develop 80 h. p. effective each, at a speed of 700 revolutions per minute, receiving 11 gallons per second under a head of 557 ft. pressure. Each dynamo absorbs 80 h. p., and working at 700 revolutions per minute, has an efficiency of 90%, an electrical output of 400 volts and 135 ampères. There is a main and return transmission cable for each plant, the cables being calculated for 1,200 volts, and having a section of copper of 0.233 in., with a conductivity of 98% of pure copper, the loss in the cables, main and return being 8%.

At the secondary station the cables are attached to six electric motors similar to the 80 horse-power primary dynamos, but owing to loss on the line they will run at only 600 revolutions. The motors drive through a shaft six air compressors, which store the air, at a pressure of 88 lbs., in steel reservoirs, whence it is carried in wrought-iron pipes to the face of the tunnel. The drills are of the Ferroux type, and are mounted upon carriages in groups of six and run forward on rails to the face. Ample telephonic connections are provided throughout the line, and all shops, etc., are lighted by electricity.

Results of the Test of the Serve Ribbed Boiler Tubes.

Below we give, as promised in our issue of April 24, the results of the comparative test between the Serve ribbed tubes and plain tubes of ordinary use.

The boiler used was an upright tubular boiler of ordinary type, 42 in. diameter, with a furnace 24 in. diameter and 24 in. high, sixty-three 2½-in. tubes, 6 feet long; 7 square feet grate area, and 285 square feet of tube heating surface exposed to the water. The heat receiving surface in ribbed tubes is about double that in the plain tubes.

Two tests, each of 8 hours' duration, were made with the boiler fitted with plain tubes, and afterwards with the ribbed tubes, and with the coal burned under a natural draft, and under a forced draft represented by ½ in. and ⅞ in. of water. An extra pair of tests was made with the ribbed tubes in use, and the coal burning under a forced draft represented by $1\frac{3}{16}$ in. and $1\frac{3}{16}$ in. of water.

The following is an abstract of the results:

	Pounds of feed water evaporated in both tests.		Average temp. of feed water.		Pounds of coal used in both tests.		Pounds of water evaporated per pound of coal.	
	Plain tubes.	Ribbed tubes.	Plain tubes.	Ribbed tubes.	Plain tubes.	Ribbed tubes.	Plain tubes.	Ribbed tubes.
Two 8-hour tests with natural draft, ⅛in. water	8,705	10,275	190.28	196.16	1,716	1,201	5.08	8.50
Two 8-hour tests with forced draft, ½ in. water	16,705	21,880	186.66	189.03	2,788	2,881.5	5.98	7.60
Two 8-hour tests with forced draft, ⅞-in. water	16,650	24,380	187.02	180.05	3,557	3,608.75	4.68	6.75
One 8-hour test with forced draft, $1\frac{3}{16}$ in. water		13,935		183.21		1,875.5		7 41
One 8-hour test with forced draft, $1\frac{3}{16}$ in. water		14,000		170.00		2,144.5		6.52

The test would have been more complete had the quality of the steam produced been ascertained.

Tunneling Under Heavy Pressure.*

BY ARCHIBALD A. SCHENCK.

II.—DRAINAGE.

The soft ground to be passed through by a proposed tunnel should receive special drainage treatment before the main work reaches it; but the drainage system should be arranged with a view to the permanent drainage of the completed arch and its load.

The injurious effect of water upon an arch is generally supposed to be chiefly by causing the materials of the arch to deteriorate and disintegrate. Possibly this may be so when inferior brick and cement are used. At West Point tunnel the cement (Norton's) of the broken or failing arch was and to-day is as hard and tenacious as could be desired. The action was mechanical, breaking the arch in pieces, slabs or layers, much as stratified rock might be broken up. Probably in most such arch failures the action is hydraulic, bursting the mass asunder in layers, and assisted by frost action in the lower courses. The uneven pressure on the arch probably causes very slight cracks, giving a much better chance for both hydraulic and frost action.

The adverse effect of water during construction is from increased and variable pressures, cavities and difficult handling of materials in excavation; but a slight amount of dampness enables the earth to arch itself better, prevents runs of very dry material, and often greatly assists the miners.

The principal and almost the only mode of draining

* See the *Railroad Gazette* of April 10.

the ground for construction purposes heretofore has been through the tunnel itself, by a drift within its proposed outline, and if possible at the bottom. After completion a few small inlets or weep-holes, draining into the tunnel itself, are relied upon. Drifts outside the arch for permanent drainage are rare, and are not often run even for transient construction purposes. Probably more was done in outside drifting at West Point tunnel than else

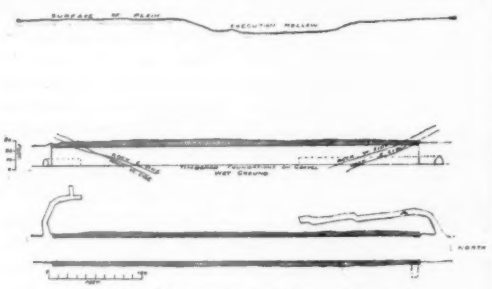


Fig. 1.—West Point Soft Ground Tunnel.

where in this country. The attached plan, fig. 1, show this outside drifting along the longest stretch of the soft tunnel work. It is taken from progress plans and profile kept by me when Resident Engineer of the tunnel; parts of it were furnished to Mr. W. H. Searles for his general article on the whole tunnel progress, published in the journal of the Association of Engineering Societies, February, 1889.*

The large amount of outside drifting done by Superintendent White at West Point was partly because of the peculiar location of the rock, as shown; but it was hoped to reach and drain the body of soft ground in advance of the main work, and to do this on the outside, drawing the water away from the arch. That the drifts were not continued further was largely due to the season of the year. The water that troubled the work shown was chiefly surface water, and became very much less during the summer months.

Fig. 2 shows an outside overhead drift at another arch of that tunnel, which was carried up to the ledge surface to cut off permanent springs. This object was secured and a very large flow diverted, but the water that was in the ground generally was rather drawn to the arch than diverted, and showed itself as indicated by the dots on the plans. To reach this an extension over

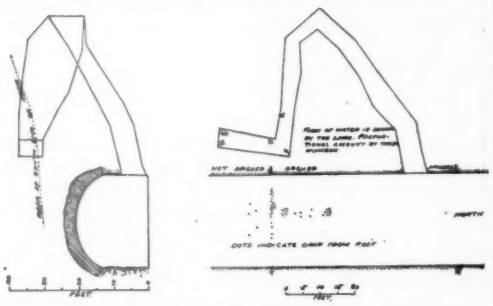


Fig. 2.—Drainage Drift, North Arch, West Point Tunnel.

the arch was proposed, and, as the flow increased after some years, this extension was made. It reduced the drip back to the amount shown for 1882, where it now remains. So far as local drainage only is concerned, such drifts, not merely approaching the arch at right angles, but carried along and close to each haunch for the entire length of the tunnel to be drained, might appear the most effective. But besides the dangerous vacancies they would themselves constitute, there would be another objection to them. They would tend to draw the water toward the tunnel and create underground waterways leading to it. Such may be in time the tendency of the overhead drift shown, requiring frequent extensions to reach the enlarging area of flow. This drawing of water toward the tunnel is one of the serious objections to a drift inside the tunnel, whether top or bottom, and to the use of the tunnel as a waterway after the arch is finished. The increasing flow drawn toward the arch causes direct injury to it. It also tends to create increasingly dangerous vacancies. It also does harm in a way the writer has never seen alluded to—in changing all the mixture of fine and coarse material above the arch into coarse material only, "washing out" this material and leaving it without cohesion and the ability to arch itself. At West Point the most serious pressures were from such open and coarse material. Thus the flow toward the arch both damages the arch and increases the pressures it must carry when deteriorated.

Parallel drifts at a proper distance on each side of the tunnel will draw the water away from the arch in each direction and leave a body of ground drained of the water in it, but not of the fine material that causes natural arching and light pressures. Had the West Point lateral drainage system been continued and made effective as part of a permanent drainage system, the underground water-courses would probably have been directed toward them and the arch have received less injury. Some boring upward in the rock portion of the drift at *A* to the ledge surface would have been necessary to complete the system. Assuming the cost of these side drifts to be $8 per foot lineal, and the main work to have cost from $250 to $375 per foot lineal, these side drifts, even for construction purposes, could readily save several times their cost in many cases. As it would be desirable to have the material coarse above these drifts to draw the water, some application of the steamed-well processes might be made that would secure this result and be beneficial if not extended too near the proposed arch location. With coarse material about the drifts they should of course be kept narrow, and cheap material be used in the construction and maintenance.

Where the surface of ground is not too far above, tubes or wells of from six to ten in. diameter could be sunk to the drifts (with perforated linings if not sunk by the steaming process). These would extend the action in drawing water from the ground toward the drainage drifts. Between these two lines of wells and drifts would lie the well-dried body of ground which the tunnel is to penetrate. These drainage lines would hold the same relation to the tunnel and load that side ditches do to the roadbed in a cut. On the other hand, relying on the tunnel itself for drainage is a good deal like running a ditch in the middle of a cut instead of at the sides.

Another important action of underground watercourses should be taken into account in planning for drainage. This is the alternate plugging up and opening of these courses by quicksand or fine sand. This action frequently takes place. Drinker refers to this action at the Musconetcong tunnel. At West Point weep holes were built through the abutments and carried up over the haunches, but were not effective for drainage. Before I left the West Shore work in 1883, I reported that these holes were running out fine sand, and should be watched or vacancies might result about the arch. Small cones of sand were noted beneath their outlets, deposited by the outflowing water. [Subsequently plugging of these weep holes prevented any injury from them. Some time ago holes were made through the abutments, and pipes of 1 in. diameter inserted. The flow through these soon ceased; but lately one of them ran out about 10 tons of sand, and the arch immediately became dry. This alternating action tells its own story of the undesirable nature of the tunnel as a drainage drift, both from the load of water thrown upon the arch by the damming up of the water-courses, and the subsequent vacancies caused by their opening out. Subjecting an arch to the vicissitudes of drainage certainly is treating it pretty roughly. It seems wiser, if possible, to coax the water away gradually to more remote outlets.

Another possible danger in this drainage drawn toward an arch is in the injury it may do to the foundations. Necessarily most soft ground tunnels have foundations mostly on soft material. If large underground water-courses are allowed to flow under them, the arch may soon become worthless. Perhaps when the arch seems driest, the injuring of the foundations may be most rapid.

Waterproof coating on the back of the arch does not relieve the tunnel from increasing coarseness of ground and heavier pressures; nor from injury to foundations.

In swelling-ground-tunnels it is well known that inside drifts run far in advance of the main work, for drainage purposes start the swelling. Although this swelling often does not become marked until a circulation of air is effected by a junction of the tunnel work, it probably in all cases begins when the first drift is run, either from access of air to the material, or from the room the drift furnishes for swelling. Whatever be the causes, side drifts might perhaps be beneficial in drawing the swelling tendency, as well as the water, toward themselves, and have something of the effect that is sought in dropping the lagging and "cutting out" in swelling ground. It is doubtful whether the side drifts would draw much water from the tunnel in swelling ground, unless very near, chiefly, perhaps, because there is often but little water in such ground. Pretty heavy timbering would be required in such drifts, and lagging of such shape as to permit ready cutting out of the swelling material.

*I make one correction of that article, namely, that the foundations were not all on solid rock, as Mr. Searles supposed.

German Locomotive Ash Pans For Fire Protection.

At the meeting of the Verein für Eisenbahnkunde, January 13, 1891, Herr Schubert of Sorau, Inspector of Railroads, called attention to a change needed in ash pans of locomotives. He said: It is necessary to do something to prevent the many fires now being set by locomotives. The Breslau-Sommerfield department has had in two years about 31 fires which have originated in sparks from locomotives. The two points whence the fire comes are the smoke-stack and ash pan. The stacks have been supplied with spark catchers, which have in part allayed the difficulty; and of the 31 fires, only five were over 17 metres from the track, while the others began much nearer. In most cases there was a strong, side wind, and most of the fires were, doubtless, caused by the ash pan. The sparks which leave the smoke-stack generally go out before reaching the ground. Those from the ash-pan are hotter, and the distance they have to go is shorter than for sparks from the stacks. Screens placed before the opening of the ash box are indifferently successful. If a very close screen should be used the entrance of air to the grate would be greatly diminished, and engineers, especially of express trains, now complain that the draft is insufficient. On the part of the lines where there is danger from fire the telegraph poles have been painted white, and the engineer is to keep the front damper closed at these points.

To remove these troubles I recommend the following simple arrangement: The places where the ashes lie are to be protected from direct disturbance by draft and so arranged that the wind cannot drive them out. This may be done by having the draft compartment separate from the ash-collecting compartment. The form of the ash box has hitherto been made as in fig. 1. *A* is the rear driving axle, *R* the grate, *F* the lower part of fire-box, *K* the front and K^1 the rear damper, and *S* and S^1 the screens. According to measurement upon one of the recent engines the ash pan was found filled to the dotted line. The weight of the ash was 57.4 kilo.; yet this amount of ash was only 3.2 per cent. of the fuel used, and was too little for the kind of coal used, which

Fig. 1.

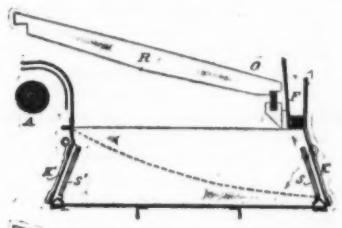
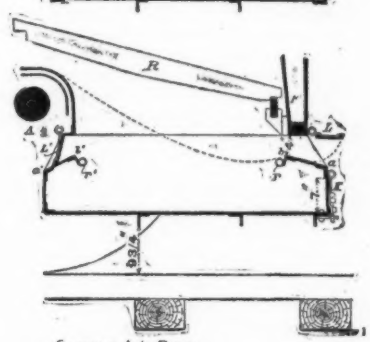


Fig. 2.



German Ash Pans.

showed that no inconsiderable amount had been lost on the way.

The proposed changes are shown in fig. 2. The difference is that at *a* and *b* in front and at a^1 and b^1 in the rear a metal shield has been riveted diagonally upward. Each of the openings above the shield serves as a draft opening, and each has a special lid, *L* and L^1. The opening for the removal of ashes is only supplied in front at *K*. The lid of this opening has a bolt, and can never be opened during the journey. To extinguish the ashes there are extinguishers crosswise at *r* and r^1, which prevent fires in the pan. In this manner there is provided a space in which the ashes are collected safely when the wind blows, and from which they cannot be carried by drafts of air.

Phenomenal Friction.*

When making experiments during the month of February, 1891, with the Thurston railroad testing machine, I noticed the ease with which the axle-box could be made to slide longitudinally upon the axle when the same was in motion.

The several boxes tried had about 14 sq. in. of surface in contact with the axle; they were variously loaded with weight from 262 lbs. upward, and the axle was running at speeds varying from 160 to 400 revolutions per minute.

One box could be moved by a pressure of 1 oz. when the axle was running, but required 32 lbs. to move it when the axle was still.

Another box was moved by 4 oz. with motion, but required 40 lbs. without motion of the axle.

A third box under considerable pressure could be moved readily by a pull of 6 oz., but 50 lbs. would not start it when the axle was still, and, indeed, on trial all the muscular force I could apply to it by my hands, with my foot against the machine, failed to start it.

A spring balance was used in these experiments for pulling the box in a line parallel to the axle.

Here we employ forces anywhere from 100 to 1 up to perhaps 1,000 to 1 for moving the same body under the same load and conditions, except that of the revolving or standing shaft beneath it.

This phenomenon of friction proved a marvel to all who witnessed it. The temptation was great to theorize upon the extraordinary performance, but no theory was offered in explanation of it. A practical suggestion was made, however, in reference to planer-bed motions and the like, which drag so heavily upon their fixed ways. If, as then proposed, revolving shafts were placed in the bed-ways and the table fitted to them, a pound pressure would move the table and its load back and forth on the revolving ways, where 1,000 lbs or more would be required to do this work upon the usual fixed V's of planers, as they are generally built.

Numerous applications of this principle will readily suggest themselves to the ingenious reader when considering the necessity and the difficulties of moving dead loads, especially where ease and celerity of the movement may be required. To the writer this unique action, as if the loaded box were floating, was an instructive object lesson in mechanics.

* By John H. Cooper, in the *Journal of the Franklin Institute.*

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

It appears that the Central Traffic and Trunk Lines have appointed a committee of 18 to confer with shippers at Chicago and see if a division of eastbound tonnage cannot be arranged. Care was taken not to publish this action, and the Chicago men who tell of it do not give the names of the members of the committee. It is proposed to try the scheme only on live stock, dressed beef and provisions, and probably the shipments out of Chicago are the only ones that will be taken hold of. The significance of the move is to be found chiefly in the indication it gives of the continued general belief that apportionment of traffic is a practicable means for securing stable rates. The division of passenger traffic between Chicago and St. Paul is said to be running along smoothly, and that of freight between Chicago and Kansas City is probably not wholly useless, though nothing has been heard of it lately. These experiments, with the long standing emigrant division out of New York, probably convince the Trunk and Central lines that the Interstate Commerce Commission will not of its own motion interfere with well meant attempts of this kind to prevent secret rate cutting and other discriminations. Whether this scheme will amount to anything is another question. Differential rates come next to division of traffic as a preserver of peace, and this has just been tried on the dressed beef business with indifferent results. After a contest of a year with no marked improvement, it is difficult to see much chance of bettering matters by the new plan. In live stock, if private cars are not either entirely excluded or else used by all the lines, the disturbance they occasion will probably be greater than any "blind pool" can remedy.

In an article published Jan. 2 we discussed the objections to "white" lights for signals and the possibilities connected with the proposition to use a color for "all clear" night signals; and the same subject was touched upon by contributors Jan. 16 and in the editorial columns Feb. 2. One of the devices referred to in the first-mentioned article was that used on the Chicago & Northwestern, involving the use of a combination of colors in the distant signal, and this is illustrated in another column of this issue. Interest centres, of course, in the distant signal, though the use of green for all-clear in the home signal will be objected to by many on the ground that the use of green on the front and rear ends of trains—a use which may be regarded as essentially equivalent to a caution signal—is so extensive that it would be impracticable or inexpedient to change the practice. It is to be noted that the Chicago & Northwestern and the Boston & Albany, two of the most important roads that use green lights in switch stands to indicate that the switch is set for the main track, and in semaphores to show all clear, do not use green lights either on engines or as tail-signals; and that they are therefore in a better position to use green for "go-ahead" than are many roads. There would be little difficulty, except in the matter of expense, in changing green train signals to blue or purple, though if a third color is ever introduced it may be found as satisfactory to use green where it now is (for caution) and use the new color for all clear, as to change the green and put the new color in its place. To compare the merits of Mr. Carter's distant signal with those of an illuminated semaphore, of a simple lamp using a third color, or of a combination of lamps giving an indication by position (not location) and possibly also showing a third color, would lead to a discussion of many fine theories which it is hardly worth while to take up at present; and if a comparison were to be attempted on the basis of experience, the amount of evidence available would be too small for satisfactory conclusions; but meanwhile it is gratifying to be able to record one experiment. As the possible dangers of a simple "white" light are apparently coming to be more generally realized, we may hope to hear of further experiments.

Mr. Stickney on Rate Regulation.

Under the title of "The Railway Problem," Mr. A. B. Stickney, of the Chicago, St. Paul & Kansas City Railway, has offered a contribution to the theory of rates and rate maintenance. His book will help the theory about as much as his railroad helped the practice. In saying this we have no desire to ridicule the work. On the contrary, it is a painstaking effort to throw new light on a question where a great deal is needed, and to do justice to all parties, instead of writing from the standpoint of one only. It contains much interesting history, and not a few bright pieces of criticism. But it does not show adequate knowledge of fact, outside of a very narrow range of personal experience. The author makes proposals to remedy evils which he has felt, without inquiring how the application of such proposals has worked under actual trial; and, not knowing this, he makes grave practical mistakes.

His view of past history is that American legislation and especially the Granger legislation, has been simply a protest against arbitrary powers of discrimination, claimed and exercised by the management of the roads. "The object of all Granger laws has been to prevent discrimination, by making all rates equal or proportionate, rather than to reduce the amounts to be collected by the railways. . . . The principle of arbitration must sooner or later be engrafted into the plan of making rates. The state is the most disinterested party to act as arbitrator." He holds that the government has not merely a right but a duty to protect the people against discrimination; that it can best be done by fixing schedules of rates; and that if the managers and shippers cannot agree as to the proper rates, the state or nation ought to come in and act as arbiter.

All of this sounds plausible; much of it is true. Undoubtedly the arbitary power exercised by railroad managers in the past, and, to a less extent, at present, has been unjust and outrageous. It is clear that the exercise of this power operated as an unequal tax, and that it was the duty of the state to check this inequality. But it does not appear that it was therefore wise to give the state the power to fix rates. There is an underlying principle of our whole social economy which Mr. Stickney seems to have overlooked. It is that a man who puts money into a business should be allowed to manage it as far as possible. The customer who only wants to pay 40 cents for a can of oil for which the dealer charges 50, is not allowed to call in the legislature to arbitrate; why not? Because in the long run the community gets better served by leaving the rate-making power in the hands of the oil men. If the legislature passes an arbitary law about oil rates, oil will fall in quality, or be scarce in quantity, or both. Such has also been the experience in railroad legislation. A community which fixes rates too low—and, in spite of Mr. Stickney's declarations, the shippers' representatives do habitually fix them too low—has to content itself with less railroad service.

The book gives us a history of the Potter law in Wisconsin in 1874; it characterizes as "absurd" the statement of Mr. Mitchell that this law was short-sighted; it implies, if it does not directly say, that the law was a fair one in its general principles. It fails, however, to tell us that after two years operation of this law, as attested by the Governor of Wisconsin, the railroads had ceased to pay dividends, and scarcely any were paying interest; railroad development was stopped, the investment of new capital checked, and the prosperity of the state seriously impared; so that the law was repealed in 1876 in the very interest of those who expected to profit by it in 1874. The "wide divergence of opinion as to the utility of Granger laws or the correctness of the principle on which they were based," which Mr. Stickney has observed to prevail, had given place to practical unanimity; and, as the last act of this drama seems to us the most instructive, we cannot conceive why Mr. Stickney should have thought best to omit it.

The principle on which Mr. Stickney would base rates is the crude English theory of the last generation, dividing all expenses into mileage and terminal. Of the more fundamental and useful division of expenses into direct and indirect, he apparently knows nothing. He has not read of the failures of the attempts to apply his theories in various parts of Europe, where the circumstances are far more favorable to such a process than they could possibly be here. He would have a legislature or commission—he does not much care which—decide upon classification, ratio between rates for different classes, proper terminal charge, and rate per ton per mile for haul; "the first three being uniform throughout the entire country, the last varying as to certain grand divisions of territory." We wonder whether he has figured what it would cost to send goods from San Francisco to New York under any mileage rate workable for short distances. We should like to know why the terminal ought to be the same for every station in the whole country; or why the ratio between classes is to be the same everywhere. On lines of large traffic for long distances, sixth-class rates may properly be as low as one-fourth first-class; on short distances for local traffic, such a rate is almost absurd. How is Mr. Stickney going to have any branch railroads at all built to accommodate new districts, if they are to be obliged to take their freight at the standard rates for the old lines? These are but a few among the many questions that suggest themselves.

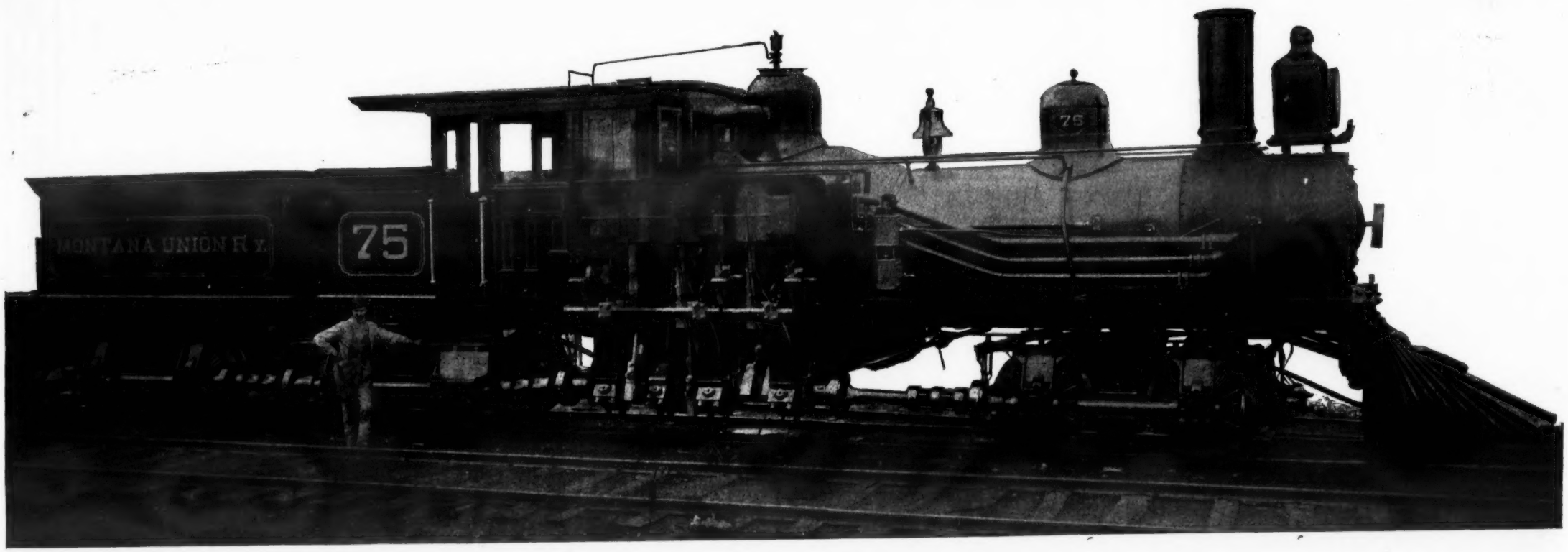
The traffic managers and agents whose "guesses" Mr. Stickney ridicules so unmercifully, have actually a better principle than he, even though they fail to apply it rightly. They make, or pretend to make, low rates where it will develop business and increase earnings faster than operating expenses. It is only by systems of this sort that rates can be made low and facilities abundant. Any mileage and terminal theory has the opposite effect; so much so that countries like Germany, which pretend to apply such a theory, actually have a vast number of commodity rates which deviate from it. Now, in spite of Mr. Stickney's belief, the American shipper wants low rates, and is bound to have them; and he insists on adequate facilities also. And if any arrangement of mileage and terminal charges, however pretty it may look on paper, prevents building railroads that are needed, and makes higher rates than are necessary or profitable on large sections of traffic, the American shipper will throw the theory overboard.

We have always believed that the best way to retain the good and avoid the evil of our railroad management was to leave the making of the schedule as free as possible, and when it was once made to allow as few deviations from it as possible; in other words, to prevent discrimination, and not to fix rates. Nothing in Mr. Stickney's book leads us to modify that view. We believe that if his proposals could be carried out they would lessen railroad construction, raise average rates, diminish traffic, and lower profits; and that even if they were once put in operation, they could not be maintained for six months.

Right of Way For Railroads.

A useful paper bearing the above title was read before the American Society of Civil Engineers last Wednesday evening by Mr. Julian A. Hall, and an abstract of it appears on another page. In the paper Mr. Hall repeats the warnings which are so frequently required, that the title deeds of a railroad will not take care of themselves but must be carefully attended to by some one, in order that the company shall be able to retain possession of its property after it has once been paid for. Mr. Hall accompanies his paper with some excellent examples of how the land maps should be prepared, and suggests that the first copy of them should be on tracing cloth, when the necessary number of copies can be readily sun-printed, with the certainty that the copies will be exactly like the originals.

Mr. Hall appears to have had some unfortunate experiences in right-of-way matters, and to have lost all faith in any kind of man, except the chief engineer of the railroad, as the head of the land department. Yet during the active progress of the surveys and construction of a railroad the chief engineer is, or ought to be, so much occupied with other affairs as not to be able to give any further attention to right of way than to have the necessary maps made. If the project is



SHAY LOCOMOTIVE—MONTANA UNION RAILWAY.

Built by the LIMA MACHINE COMPANY, *Lima, Ohio.*

one of any importance there should be a distinct department of right of way and lands, to which the securing of titles should be intrusted. The investigations required for insuring a secure title to any piece of ground in any long-settled country demand the services of an experienced conveyancer, and he should have a reasonable acquaintance with the values of property along the line, in order to check the proceedings of the agents employed to deal for the real estate. The chief engineer is, in most cases, new to the country in which the surveys are to be made, and has only one special qualification for the work of land agent—he is quite sure to be disinterestedly interested for the company by which he is employed.

Mr. Hall especially recommends that everything connected with the right of way should be kept as long as possible out of lawyer's hands; no doubt meaning a certain class of lawyers or such lawyers as he has had the misfortune to be associated with. Yet there are others whom we have known who are as prompt in the conclusion of affairs and as careful and orderly in their custody of papers as engineers are. It would be more judicious, we think, to employ lawyers acquainted with the chains of title in their sections of country to examine every conveyance, especially in a region long inhabited, but to select such as have a reputation for promptitude and accuracy; and the head of the land department can easily keep track of the persons to whom the conveyances have been entrusted.

With one other recommendation of Mr. Hall we are compelled to disagree. He seems to advise granting permission to adjacent land owners to cultivate the right of way up to the edges of the slopes upon a simple permit signed for the railroad company by the chief engineer. This seems to us like the case of the Dutchman who executed a note of hand payable to his neighbor, and kept the note himself in order to remember that he owed the money. By the plan proposed the railroad company has nothing to show that the land is occupied by permission. In every such instance a formal lease of the property should be executed, of which the company should retain one copy; otherwise the occupancy by the adjacent land-owner for a term of years will impair the company's title. But the safest rule for the railroad company to adopt is to fence its right of way and all its other lands, exactly upon its lines, and to maintain its fences upon them. It can then permit such cultivation as it may please, with comparative safety; yet even then it is better to execute a lease conditioned upon the user's keeping the ground clear of weeds and brush.

Circumstances will influence the manner in which the titles shall be kept and who shall look to the conservation of the company's rights after the railroad is completed; but this is certain, that if this duty is not intrusted to one faithful and responsible person, who gives it constant attention, whether he be of one profession or another, the company will lose valuable possessions, which it will cost time and money and vexation to recover.

A Neglected Means of Increasing Passenger Traffic.

An event which happened last Wednesday afternoon brings to mind a rule of conduct laid down years ago by that large-minded and successful railroad manager, General Devereux. His subordinates were instructed that politeness was one of their first duties. The incident of Wednesday was not peculiar, and therefore has the more value as an example. A freight wreck in the Bergen tunnel stopped all trains to and from the Jersey City terminus of the Erie, from two until about five o'clock. The Erie does an immense suburban business on its main line and branches and operated roads. As the afternoon wore on the waiting room at the Jersey City station became so packed that one could scarcely move. But the only information given to the passengers, who steadily accumulated, was a notice on the back of a telegraph blank, pinned up by the ticket window, to the effect that owing to a freight wreck in the tunnel no trains would go out for two or three hours. For those who saw this notice the information was sufficient. They could seek some other way home. But the great mass of those who crowded the waiting room did not see it, and, in fact, for women it was practically impossible to see it, the crowd was so dense. Moreover, not one in a hundred of those who pass through this station in the afternoon ever goes to the ticket window, so that there is no habit of seeking information there. Those who tried to get information from the gatemen and ushers were answered with an insolence which was only equalled by the men's ignorance of the condition of things. It is notorious that the employés of the elevated roads of New York are courtly, old-school gentlemen compared with the Erie stationmen in Jersey City.

As a result of the whole inadequate arrangement people were allowed to pour across both ferries and then return to the New York side to take other roads; and, what was worse, up to the time when the first trains started out the notice remained posted that no trains would go out for two or three hours, and no information to the contrary was given.

Now we do not ask or expect railroad officers in an emergency to waste time smoothing down passengers; but we have long held and said that the man who has transportation to sell is just as shortsighted as any dealer in any other commodity if he does not try to make things pleasant for his patrons and customers. This is so self-evident that it seems unnecessary to mention it until such an incident as we have described reminds us that General Devereux' rule is still ignored on a great many roads.

Had the Erie officers and men been in the habit of thinking that consideration of the comfort of their patrons has a commercial value, that consideration would not have been entirely absent in this emergency. It would have been instinctive.

Of course we know perfectly well that no superintendent at the Jersey City station could have known very long ahead just when the tunnel would be cleared; but with connection by wire from the tunnel direct to the dispatcher's office, certainly this could have been known within half an hour. In fact, one of the first things to be done in any wreck on a busy line is to tap a wire, if necessary, and establish communication with the Superintendent. Even in the absence of precise information, any visible evidence of a wish to tell passengers what can be told will go a great way toward keeping them good humored, and it seems a pity not to make all convenient use of a commodity so cheap and so profitable as politeness. We do not tell this story for the sake of scolding the Erie, or to display its delinquencies, but because it has a moral for some officers on every railroad in the United States, and for most officers on some railroads.

Compulsory Safety in England.

The British Board of Trade has published a pamphlet showing in detail the orders it has issued to the various roads under the Regulation of Railways Act of 1889, compelling the adoption of the block system, interlocking of switches and signals and continuous brakes on passenger trains. It will be remembered that all the roads in the United Kingdom have received such orders and that they must be carried out within certain periods, varying from one to two years. The pamphlet is of interest chiefly as showing the length of time granted to the various companies and the exceptions to the requirement which are made in certain cases.

The simplest form of order requires the adoption of the block system on all lines of a company, except those portions which the Board of Trade specifically releases from the working of the law; the interlocking of switches and signals except where switches are locked by Annett's key or other arrangement approved by the Board of Trade; continuous brakes on all passenger trains, instantaneous in action, self-applying in the event of failure, applied to every vehicle in the train, used regularly and of durable construction, etc. The brake requirements are modified as follows: A certain portion of the vehicles in passenger trains may be equipped with pipes only, but if they carry passengers they must have an automatic brake of some kind, even if it differs from that in use on the other cars of the train; one car in four of passenger trains stopping once in 10 miles and one in six of trains making longer runs may be thus unbraked, but the last vehicle must, except in emergency, be fitted with the continuous brake used by the company. To avoid serious delay one vehicle only may be run behind the last car on which the continuous brake is in use. In counting vehicles the engine counts as two, the tender as one, eight-wheeled carriage as two and horse boxes and four-wheeled vehicles not carrying passengers to be counted as one-half.

A limited number of mixed trains may be run provided the passenger cars are kept in front and braked with a continuous brake; that the freight cars have one brake van for every 10 cars; that there shall not be over 25 vehicles in the train altogether; that the maximum speed between stations shall not exceed 25 miles an hour, and that the train stops at least once in 10 miles.

The dates set for compliance with the orders vary on different roads. For instance, the London & Northwestern must have the block system by Nov. 20, 1891; interlocking, May 20, 1892, and continuous brakes, Nov. 20, 1892. The Great Northern of Ireland, on which the Armagh collision occurred, must have all three of the improvements by May 20, 1892. One small road is given until March 5, 1893, to complete interlocking, and until March 5, 1894, for continuous brakes. A few other companies have long time given, but the majority of roads must have the whole done by either May or November, 1892; and November, 1891, is the date set for the completion of the block system on a large number of roads. The very considerable variety in the dates indicates that the inspectors of the board have carefully examined the conditions of each road.

The Great Western, the Lancashire & Yorkshire, the London, Brighton & South Coast and the London, Chatham & Dover have been served with a separate form of order, which apparently differs from the general form chiefly in minor details in the exceptions. That sent to the Great Western contains a long list of proprietary lines controlled by the company. Why this was necessary in this case and not with the other large systems does not appear. The Festiniog and other small roads are also made the subjects of orders a little different from the rest.

It will be remembered that this action under the law of 1889 is not of very great importance except in Ireland and in exceptional cases in England and Scotland, as a large share of the roads are already well equipped. The latest returns show 98 per cent. of the double lines of England worked by the block system; Scotland shows 100 per cent., but Ireland only 31 per cent., bringing the average for the United Kingdom down to 94½ per cent. Of single-track roads, however, only about 5,000 miles out of 8,000 have the block system. The law does not say how rigid the block system must be, and permissive blocking will doubtless be allowed, so we cannot estimate the extent of the improvement that will be effected on these single lines.

Of the 40,000 switches and grade crossings of tracks on the passenger lines of the United Kingdom, about 36,000 were shown in the last annual report as protected by interlocking, thus leaving only one in ten to be protected. Of this 40,000 it is stated that 23,160 are siding connections, and apparently 98 per cent. of these are provided with safety points [throw-off switches].

Eighty-one per cent. of the passenger-train vehicles were fitted with approved automatic brakes, and 15 per cent. were fitted with a continuous brake of some sort, leaving only 4 per cent. to be fitted.

These statistics are all more than a year old, so that the actual work yet to be done may be considerably less than appears on the surface. It would seem that the government has been very lenient in applying the pressure of the law.

On Sunday morning, May 3, the new interlocking at the Jersey City terminal of the New York, Lake Erie & Western was put into service. The plant covers all tracks between the train shed and the tunnel, a distance of about one mile, and is operated from three towers located at nearly equal intervals between these points. Eventually the three machines will be interlocked so as to form a complete system of blocks, but at present only the main tower is operated. The other parts of the installation are completed and will be put into service in the near future. The main tower which is situated a short distance from the train shed contains a sixty-four-lever machine controlling all switches and slips leading to and from the eight terminal tracks. The main terminal signals governing the train movement over these tracks in both directions are carried upon a bridge which spans the yard just beyond the signal tower. By indicators each semaphore arm is made to serve as the signal for several tracks, the number of the track being displayed below the arm as it drops to the clear position. During the busy hours of the day three lever-men are required to operate the machine in the main tower, but two only are in attendance during the hours of light traffic.

An improvement has also been instituted in the method of giving train conductors the starting signal. This was formerly done by taps of the bell, which plan was open to the usual objections to audible signals. All tracks are now separated from the passenger house by a fence extending across the train shed, and having gates at the ends of the train platforms. At the end of each track there is a small semaphore blade carried on a mast about 12 ft. high. This signal is operated from a tower placed immediately above and in easy communication with the depot master's office. On the arrival of the last boats from the up-town and down-town ferries which are scheduled to connect with a particular train, the boat slips are deposited in the depot master's office, where they are signed and sent up to the signal man above. On receipt of these slips he notifies the main signal tower that a train is ready to depart from a certain track. This notice is given by means of an annunciator and is answered by an electric bell. As soon as the answer is received from the main tower, the small arm at the end of the track is lowered to the clear position, which informs the train conductor that his train must depart. At the same time the gates are closed by a guard.

This entire plant was put in by the Johnson Railroad Signal Company, and will be fully described and illustrated in a later issue of the *Railroad Gazette*. Although the machine was put into service for the first time on Sunday, the locking has been completed for some time, and for three weeks the lever men have been familiarizing themselves with the different movements. Notwithstanding this precaution much vexatious delay was caused to passengers, and trains have continued to arrive much faster than they could be taken care of.

An unfortunate derailment and wreck in the tunnel on Tuesday served to complicate things still farther, and it will probably be some time before the machine can be made to work with the precision necessary to successfully handle the great number of trains at this station.

At present there are 116 trains arriving and 118

trains departing at this point in 24 hours, making 234 trains in all. But the making up of these trains involves an engine movement of four times as much, or 936 movements at the main tower in 24 hours. During the seven busiest hours of the day the average is about 70 movements per hour, and in spite of the delays referred to, it is greatly to the credit of the management that no accidents have occurred on account of the new arrangements.

The following are the figures of the cost of maintenance of couplers which were presented at the recent meeting of the Mechanical Officers of the Vanderbilt lines:

New York Central & Hudson River (knuckles).

Vertical plane coupler "A" cost for 3,434 cars, per car..... 1.03
" " " "B" " 1,609 " " 1.75
" " " "C" " 5,506 " " 1 10

Lake Shore & Michigan Southern (knuckles).

Cost per car for 2,081 cars..... 1.16

Michigan Central (complete).

Number of cars not given. Cost per car..... 1.48

Chesapeake & Ohio (knuckles).

Cost per car for 1,200 cars..... .91

The above figures show the average cost per car per year for knuckles only, with the exception of the Michigan Central, which average includes the coupler complete. Lake Shore & Michigan Southern average is based on a record kept for five and one-half months. The Chesapeake & Ohio average is based on a record kept for nine months. The New York Central averages are based on a record of one year, 1890.

New York Central & Hudson River (links and pins).

Cost per car for 25,828 cars..... 1.54

Lake Shore & Michigan Southern.

Cost per car for 19,000 cars..... 1.84

Michigan Central.

Cost per car (number of cars not given)..... 1.39

Chesapeake & Ohio.

Cost per car for 10,400 cars..... .87

The above averages are based on records kept for one year.

The bill before the Massachusetts Legislature (referred to three weeks ago) to relieve the cities from the restriction placed upon them by the clause of the grade-crossing law, which forbids a change in the grade of tracks without the railroad company's consent, is still under discussion. It was not favored by the committee, but the lower house has finally voted by a large majority in favor of the cities. As, however, the measure is regarded by conservative men as a general law to meet a special case, it is very doubtful if it passes the senate. Two other bills before the legislature have become laws. They aim simply to perfect the law of last year, and are summarized as follows:

Chap. 33 provides for considering the abolition of several adjacent crossings or the crossing of several railroads by a highway as one matter.

It also provides that the commissioners appointed to decide upon the abolition of a crossing of more than one railroad at or near the same point shall equitably apportion the 65 per cent. imposed on the railroad among the several companies owning the railroads so crossed.

Chap. 123 provides that damages sustained by an abutter *by the discontinuance of a highway* shall primarily be paid by the city or town, etc.

The nest of crossings in Chicago, which was illustrated in our issue of April 24, is a locality which for a number of years past has received the attention of various engineers, and of late this interest has been heightened through anticipation of a large increase in the number of trains necessarily incident to the World's Fair. This increase, which will undoubtedly be very great, is sufficient cause for the investment of considerable sums of money in the erection of plants which have been proposed. The efforts of Mr. Wallace in this matter have been simply from a professional standpoint and entirely apart from his railroad connection, and the successful carrying forward of this much-needed undertaking shows in a marked degree the confidence had from the first in his judgment by all the lines concerned. This subject of rapidly getting out of the centre of the city is becoming more and more serious, and the existing lines will realize this more keenly when the elevated road commences operations, and will be forced to take some immediate action.

The Canadian Pacific steamer "Empress of India" arrived from Japan last week Tuesday, and the passengers were rushed through from Vancouver to Montreal by special train in four days. It is believed that they will reach Liverpool in 21 days from the time they left Yokahama, which will, it is said be 14 days less than the best time heretofore made via San Francisco. This fast run realizes a favorite prediction of President Van Horne, who has often said that the 2,906 miles between Vancouver and Montreal could be covered in 100 hours. In this case the special train reached Montreal Saturday evening in 92 hours from the Pacific coast, making the average rate of speed 31.6 miles per hour. Besides the usual stoppages, the train was delayed two hours by a snowslide in the Rocky Mountains.

As we announced April 10, the chiefs of the mechanical departments of the Vanderbilt lines, at a meeting held in New York April 3, have recommended the use of the M. C. B. coupler on all the freight equipment of those roads. In addition, they recommend the adoption of the Sewall coupler and rubber-hose connection for steam-heating pipes, and recommend that the presidents of the roads demand and urge the application of the Westinghouse air brake to all refrigerator cars and through stock cars running on those lines.

NEW PUBLICATIONS.

Practical Switch Work, a Hand Book for Track Foremen. By D. H. Lovell, Pennsylvania Railroad. New York: D. Van Nostrand & Co.

This is a volume of only 174 12mo pages, but it is a complete treatise on the subject with which it deals, and as such is well worth the attention of maintenance of way men of all grades. The lucid and simple explanation of theories, together with their rational reduction to practical methods, and the many useful tables contained in its pages, make it especially valuable as a text-book and pocket reference book for the guidance of foremen who are actually engaged in the work. Experience has proved that the best informed supervisor is apt to have the best informed set of foremen and usually the best track. While Mr. Lovell's book may contain little that is new to the many supervisors (though we are far from asserting this), it is certainly an excellent vehicle by which to convey this information to the foremen, and it is a safe one, because Mr. Lovell's views are unquestionably sound.

The Corliss Engine. E. P. Watson & Son, New York. 90 pages, pocket size, price $1. The book contains two articles, the first by John T. Henthorn on the construction and erection of the Corliss engine, 60 pages; the second by Chas. D. Thurber on the management of the Corliss engine, 30 pages.

The Railway Problem. With Illustrative Diagrams. By A. B. Stickney, Chairman Chicago, St. Paul & Kansas City Railway. Octavo, pp. VIII + 250. No index. St. Paul: D. D. Merrill Co., 1891. Price, cloth, $2; half leather, $2.50.

This book is considered at length in the editorial columns, therefore we make no further notice of it here.

TRADE CATALOGUES.

Illustrated Catalogue of Hand Tools for Cutting and Threading Steam and Gas Pipe. D. Saunders' Sons, Yonkers, N. Y.

The tools shown are pipe and threading machines, both hand and power, threading and tapping attachments for the same, chucks, dies and die stocks, reamers, etc.

Catalogue of Railway Specialties. By the Q. & C. Co., Phœnix Building, Chicago, Ill.

The specialties carried by the company and illustrated are the Q. & C. trolley door, the Dunham door, the Servis tie plate and Davies lock spike, the Globe ventilator and the Keystone car replacer. The company has recently added also a very interesting specialty in the Q. & C. automatic brake adjuster, which was illustrated and fully described in the *Railroad Gazette* of Jan. 23, 1891. The reader will remember that this is a very neat device for automatically taking up the wear of brakeshoes.

Early German Studies of American Railroads.*

V.—STUDIES BY HENZ IN 1859.

The next work we call attention to is 20 years later, and not the first since Gerstner by a German engineer, but, we think, quite as little known as Gerstner's older book.

About the end of April, 1859, an eminent Prussian railroad man, Privy Government Counsellor Henz, accompanied by a mechanical engineer, Mr. Bendel, at the cost of the government, began a systematic investigation of the American railroad system. They remained in this country nearly six months, during which Henz collected a vast amount of material, and began to prepare what he intended to be an extensive work, embracing the development of transportation in general and railroads in particular, with full details for the latter. The peculiarities of the construction and working of our railroads, their legal relations, the organization of their administration, their methods of accounting and auditing and their economic and financial results, all were to be thoroughly discussed in this work. Unfortunately, Henz had but fairly begun what promised to be a mom umental work of the very highest value for our railroad history, putting on record the condition of our railroad system just before the war, when he was carried off by a fever, a few months after his return to Germany, leaving only some fragments completed, and the outlines of his proposed great work not in condition to be filled from the material collected. What he left completed, however, was, with the help of his travelling companion, prepared for publication in the Prussian Ministry of Public Works, and published in 1862, in one thin volume of text and one of plates; there are but 74 pages (7½ × 10 in.) of text, followed by eight plates of similar size, but there are no less than 40 plates in the volume of plates, each about 10 in. × 16 in., including hundreds of figures, representing chiefly rolling stock and bridges, with many details of the former.

This work, we believe, is practically unknown in America, when it might have been of very great interest and no little value, considering the difficulty, and often the impossibility, of obtaining drawings, not to say engravings, of many of the appliances then in use. It is painful to think that a considerable stock of these books, which had remained for almost a generation in the Russian Ministry of Public Works, was sold as waste paper not very long ago! We Americans, who wanted it, did not know of its existence, and, perhaps, on account of its fragmentary character, it did not seem to attract attention in Germany. At least, the leaves were not cut in the copy now in the Library of the Prussian Ministry of Public Works when the writer first examined it.

Perhaps additional evidence that it did not attract attention in Germany may be found in the fact that Henz paid particular attention to horse railroads, then comparatively a novelty, illustrating no less than 13 rail sections of such roads, with other details which show that he appreciated their importance; and yet it was not till the middle of 1865 that the first horse railroad was opened in Germany. We must remember, however, that the Germans like to sleep over a new idea before they put it into execution. In this case it was a Danish engineer who sought for permission to build such a railroad, but it seems that the authorities were not yet convinced that it would not interrupt traffic or be dangerous in ordinary streets. For the concession which they gave was for a line lengthwise directly through the middle of the Thiergarten, the great public park of Berlin, which is somewhat similar in shape and size to Central Park, (but which already had a highway where the street railroad was laid).

When Henz was here, there were already 46 miles of horse railroad in New York and Brooklyn, and 60 miles in Philadelphia, and he points out that the dangers apprehended from them had been proved not to exist, that the public had gained largely by them, and that they were profitable to their owners. He notes particularly that they relieve, instead of complicating, the other street traffic, and like a prophet declares that the great crush of traffic on Broadway would be relieved if street cars took the the place of omnibuses. Henz, it is true, was not the first to describe an America street railroad. That had already been done by the Austrian engineer, Von Gerstner, who visited this country in 1839; but at that time it cannot be said that the horse railroad had been proved to be generally applicable to city traffic. Relatively a very large part of the Henz work relates to this mode of transportation—16 pages out of 74—but of course this may be because this part of his work was more nearly complete when he died.

Next in order in the book is a chapter on the transportation in the Pennsylvania anthracite regions, with a particular description of the Mauch Chunk inclined-plane railroad, including a separate chapter on wheels, axles and journal boxes. Thirty-one pages and 10 large plates of engravings are devoted to American rolling stock.

Cast-iron wheels attracted the author's attention particularly, and he gives comparative statements of their cost, which remind us of the many published in these columns a few years ago relating to cast-iron and steel-tired wheels. But in 1859 the comparison was with wrought iron tires, and Henz shows that the latter cost fully twice as much as chilled cast-iron wheels. He says:

The renewal of the wrought-iron tire becomes necessary when the wheel has run 20,000 to 24,000 miles. With the use of good material, a suitable form and proper care in the casting, the cast-iron wheels run the same distance before the hard chill has worn away so that the wheels must be removed; meanwhile the running surface takes on such a high polish as only hardened cast steel shows, which contributes materially to the reduction of the rolling friction and to saving the track. Now if we take into consideration the wretched condition of the track of most American railroads, for the maintenance of which only what is indispensable is done, we cannot fail to be astonished at the performance of these wheels. The rails are always badly connected at the joints, fish plates are scarcely known, wrought-iron base plates or cast-iron chairs are made to do, and the latter are often so high on the inner side that the wheel flanges run on them. Not infrequently rails are seen in main tracks the heads of which have been pressed away. In spite of the shocks which the wheels have to endure under such circumstances, breakages occur very seldom, and when they do the consequences are no more dangerous than those of a tire's coming off. There is usually a safety stirrup on the truck, which holds the axle in case a wheel breaks.

What would our wheel founders say now to a service of 20,000 to 24,000 miles per wheel?

American wheels he found to have very little conicity, and what they had was given apparently in order that they might be readily removed from the molds in which they are cast, as the rails are not inclined, as in Europe. The axles boxes are particularly commended as keeping out dust and preventing waste of the lubricating material.

It is noticeable that Henz found cars lighted by gas on the New Jersey Railroad in 1859, and so successfully that he describes the apparatus quite at length, and reports it to have been 30 per cent. cheaper than the stearine candles previously used. He also says that it was used on several other roads, so that one might have expected it to be in general use long before this. Later we have gone to Prussia for gaslight in cars, where it has been almost universally used for several years, while we—well, we have lamps still on some trains.

All roads, he says, which have night trains, run sleeping-cars. He describes what most of us have forgotten. There were a mattress, a blanket and a pillow to lie on, and the passenger was expected to furnish his own covering. The brakeman could make up the beds for a whole car in five minutes. About the middle of the

* The other articles on this subject will be found in *The Railroad Gazette*, February 13 and 27, March 20 and April 3.

length of the car a curtain separated it into two apartments, one for each sex, and the ladies' side was further distinguished by having curtains for each bed. (You were not expected to undress, at least the men were not.) The price was 50 cents a night, and the sleeping-cars were very generally used.

In discussing the operation of the roads, the train dispatcher, then in his infancy, is mentioned as having already found place on many roads, and his duties are described. Consecutively numbered tickets were not generally used. The Baltimore & Ohio had introduced them. Very many passengers bought no tickets but paid the conductor on the train, and it was not easy to avoid it, as almost all station platforms were always open to the public, and *tickets were not sold at way stations*. There were no trains on Sunday before 6 o'clock in the evening; even through trains which started on Saturday lay still, on the way, over Sunday, though on a few important roads there were sometimes excursion trains on Sunday. To Europeans, the absence of a uniform for employés was sometimes embarrassing, as one did not know of whom to make an inquiry. The conductor sometimes, while taking up tickets, put in his buttonhole a metal plate with the inscription "Conductor"; but it disappeared as soon as he had finished this task. The trainboy was then in all his glory, and it is observed that, while he sometimes peddles something to eat, he never offers anything to drink, contrary to the custom of his German substitute, who at the stations seems to drive a better trade in beer and coffee than in anything else, though he sells eatables in abundance. The "baggage express" is noted as a convenience.

In describing the efforts to make powerful locomotives with light weight per driving wheel, our author says:

"The Americans are compelled to the greatest economy in regard to superstructure, since they roll very little iron themselves, and therefore get it from England, burdened with a duty of 30 per cent. On this account the rails are seldom more than 3½ in. high, and, since many roads pay for them only with bonds, are, moreover, frequently of bad material. The weakness of the rails is somewhat relieved by increasing the number of ties, which on some roads are so close together that there is scarcely room enough for tamping between them."

The work has 11 pages of text and six sheets of drawings relating to locomotives. There is scarcely an opinion expressed in what is said (this, doubtless, would have come later if the author had been able to finish his book), but the descriptions are quite minute and the objects arrived at by peculiarities of construction are usually explained. "On freight engines the tires are of cast iron throughout, with chilled thread; wrought-iron tires are used on passsenger engines only in the northern States and in Canada; cast-steel tires have nowhere come into use." There are illustrations of the boiler of one of Millholland's passenger engines, of one of Ross Winans' 8-driver, anthracite burners, of a bituminous coal-burner designed by A. F. Smith, of the Hudson River R. R.; of the Boardman and the Dimpfel boilers for bituminous coal; the Millholland tubular-grate firebox, the Sill firebox, and a Baltimore & Ohio freight engine with six driving-wheels, the latter with many details.

The investigator, like most European engineers, was much impressed by our timber bridges and viaducts, and he illustrates their construction, as also that of some iron bridges. The Howe bridge over the Mississippi at Davenport, the McCallum bridge on the Erie road over the Delaware, samples of Whipple and Bollman bridges, and the Harlem River drawbridge, are among those figured, there being 16 sheets of bridge engravings and 20 pages of text relating to them, a considerable part of the latter relating to the Victoria Bridge, at Montreal, then not quite completed, but regarded as one of the wonders of the world.

This work, by the way, is still obtainable, for when the Prussian Government turned over its stock to the paper-makers, a Berlin bookseller kept a few copies, of which, perhaps, some of our readers will be glad to relieve him.

Right of Way for Railroads.*

It has been thought that occupancy of land by a railroad for a term of years gives it a title to the land, but a recent decision has shown that this belief is incorrect, and that a railroad can only acquire land by settlement with the owner or by condemnation. Another matter which sometimes gives a good deal of trouble is to prove the ownership, even where the title has apparently been acquired. . . .

There are a great many engineers who refuse to have anything to do with securing right of way, claiming that such work is out of their line. It is, however, largely to the interest of the company to employ an engineer who has good business judgment, as well as engineering knowledge, to have it understood that the right of way is to be secured and put in proper shape under his direction, and to give him as his right-of-way agent an honest, competent, business man. This man should report only to the chief engineer, who should be empowered to make on a prescribed basis such settlements for right of way as he may deem proper and for the best interests of the company. As settlements are made the deeds should be immediately recorded, and after the chief engineer has had a copy of them made in his office they should be turned over to the secretary of the company. As the deeds are received by the chief engineer he should have his right-of-way maps completed, copies of which, when required by law, he will have recorded at the court houses of the counties through which the line passes. The originals should be retained for file in the chief engineer's office, and with these and his copies of deeds he will be fully equipped to give prompt and satisfactory information pertaining to all right-of-way matters that may arise.

*By Julien A. Hall, M. Am. Soc. C. E. A paper read before the American Society of Civil Engineers, at the meeting of May 6, 1891.

As soon as the preliminary survey for a railroad is begun, a right-of-way agent should be put in the field, whose duty it should be to secure signatures of property owners to an agreement, providing that so soon as the railroad is constructed, a proper deed for a right of way of prescribed width shall be given. . . . The signatures having been secured, the right-of-way papers should be recorded promptly in the court-houses in the counties in which the signers live. This recording will in some states have the same effect as a deed, and prevent the signers from making over their right to the land to anyone else, thus saving the company possible trouble by any change of titles or otherwise. . . .

As soon as most of the signatures have been secured, the work of securing deeds from those who signed the right-of-way agreement, should be vigorously prosecuted, and every effort made to settle the cases. A good many of the land owners will regret having agreed to give the right of way, and will try to get out of it by claiming various verbal conditions and agreements entered into with the right-of-way agent, for which reason, if for no other, the same man who secured the signatures to the agreement, should be the one to take the deeds. He is then prepared to deal intelligently with any land owner who may attempt to plead such conditions. Where parties demur about making deeds in accordance with their agreement, the company should stand firmly on its rights and fight it out in court. One thing, however, I would especially recommend, and this is that everything connected with the right of way be kept as long as possible out of the lawyers' hands; any one who has had experience with lawyers in such matters will appreciate this remark.

All deeds should be made up in the chief engineer's office, and not one should be sent out without being numbered and charged to the person to whom sent for attention. These charges should be made in a book in which sufficient space should be allotted to each deed, to allow a full summary of the case from the first move in it until its final settlement. This record should show the name of the railroad, name of the party to make deed, number of acres taken, consideration, and when and to whom sent. A careful brief of all correspondence about each case should also be made a part of the record, and a thorough register, carefully kept as indicated, will save much time and labor. In settling for right of way, it is often the case that a much better settlement can be effected if the money is in hand to be paid as soon as the amount is agreed on; for this purpose a sufficient amount should always be in hands of the chief engineer, to be disbursed as he may find necessary. When this money is delivered to the chief engineer, he can receipt a regular voucher for same, the wording of which should state that the amount thus advanced is to be paid for right of way expenses and accounted for by sub-vouchers to be receipted by land owners, same to be properly approved and turned in to the auditor, who will make the proper credit; therefore when payments are made for right of way or damages, a receipt on a proper voucher should be taken for amount paid, as well as taking the signature to the deed. . . .

To cope successfully with matters pertaining to settlement of right of way, a man should have some special fitness for the work. Ordinarily the man selected is one well known throughout the section in which he will be at work, and generally such a man is either a politician or a lawyer. In rare cases such men are satisfactory, but generally they are unbusinesslike, careless, and apt to neglect points which they may consider small and unimportant, but which may, years afterward, be the very ones for which some scheming lawyer is looking. I have always thought that a good level-headed trader and business man, and one who is incorruptible (if such a man can be found), would be a far better man for right-of-way work than one whose principal recommendation is his acquaintance with the people.

It is often the case that individuals granting a right of way, desire a permit from the company allowing them to cultivate the land on the right of way and up to the edges of the cuts and fills, until such lands are required for the use of the compnay. There is generally no objection to granting this permission.

The making of right-of-way maps for permanent record is a matter that should receive the most careful attention. The first set made up should be used as progress maps on which the date of each settlement, as made, should be entered, and as rapidly as possible; maps showing the alignment, grade, width of right of way, etc., should be finished up on tracing cloth in mile sections, and on the scale of 1 in. to 200 ft. The trouble with the generality of right-of-way maps is that they contain too much that is useless, and too little that is useful. . . . In this connection a satisfactory and economical permanent record for the court can be made by blue-printing the tracings on linaura or prepared blue-print cloth. In this way the labor and expense of making additional maps is saved, and one may be sure he has exact duplicates without checking them over.

As the subject of right of way for railroads is one that will every year become more important, and one with which almost every engineer will at some time have something to do, I very much hope that the members will discuss this paper fully, and give their views, pointing out any defects that may exist in methods proposed, in order that others may profit by their experience.

New Forms of French Passenger Cars.

The advance which has been made during the last few years in the first-class passenger equipment of French railroads is well illustrated by an article in a recent number of *Les Annales des Travaux Publics*, in which the exhibits of cars at the expositions of 1878 and 1889 are compared, and several of the new or improved forms are illustrated. The accompanying illustrations show the more notable departures from the common type of European passenger coaches. The letter *L* denote the location of the lamps, and the letters *W* and *P* the closets.

Fig. 1 represents an arrangement of compartments adopted by the *Midi* Railroad. The end compartments are of the ordinary eight-place form, but the centre compartments contain but four seats, three of which can be converted into beds, as indicated in the figure. A toilet-room is provided for each of these centre compartments. In another arrangement used by the same company, one of the end compartments is provided with a toilet-room, while the middle compartment and that at the other end can be thrown *en suite*, one toilet-room serving for both.

Fig. 2 shows an arrangement adopted by the State Railroad. It will be seen that there is a passage extending through the car, connecting the end platforms, which are inclosed. There are four six-place compartments, and two compartments containing but three seats each, which can be extended, as illustrated. The car body is 53.5 ft. long, and is mounted on trucks. Figs. 3, 4 and 5 represent different forms adopted by the P. L. & M. Company. All of these cars are mounted on four-wheel trucks, and are provided with hot water heaters and toilet-rooms.

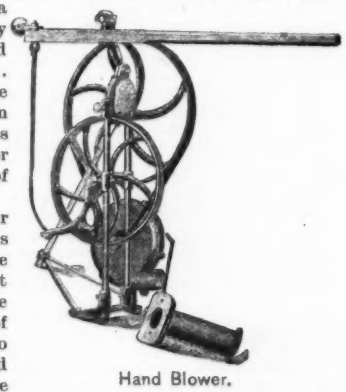
The following table gives the length, total weight, and weight per passenger, of the cars which are illustrated, and also of other modern French cars:

Railroad and class of car.	Length and width of car-body. Feet.	Total weight empty. Pounds.	No. of passengers.	Weight per passenger. Pounds.
P. L. M. 4 compartments, Standard type	29.8 × ...	31,400	32	980
Midi. Fig. 1	29 5 × 9	25,406	24	1,058
Ouest. 2 ordinary compartments and state-room with toilet	25 × ...	23,190	21	1,10(
Compagnie Francaise de Matériel de chemins de fer. Similar to fig. 4	52.5 × ...	54,000	48	1,124
Est. 2 seven-place and 2 six-place compartments, all connected by passage. Toilet	31.4 × ...	30,900	26	1,184
Midi. 3 compartments with toilets	25.9 × .	23,400	20	1,168
Etat. 3 compartments. Old type remodeled	23 8 × ..	22,0' 0	18	1,224
P. L. M. Fig. 3	67.1 × 9.2	79,500	48	1,655
P. L. M. Fig. 5	64.6 × ...	81,300	47	1,730
Orleans. 7 six-place compartments. 4-wheel trucks. Closed platforms. Toilets	55.9 × 9.8	72,700	42	1,730
Nord. 3 state-rooms with toilets	28 9 × ...	28,000	16	1,747
P. L. M. Fig. 4	67.4 × 9.8	83,200	48	1,733
Etat. Fig. 2	53.5 × 9.7	57,300	30	1.9'0
P. L. M. 3 state-rooms with toilets	31.9 × ...	38,900	9	4,324

The Cyclone Portable Forges.

We show herewith illustrations of style O, portable blacksmith's forge, and style No. 2 hand blower with tuyere iron as manufactured by the Foos Manufacturing Co., of Springfield, O. The portable forge has a hearth 28 × 40 in. and stands 30 in. in height. It has a coal box 22 × 8¼ × 6 in. deep, also a fan 14 inches in diameter, and weighs complete 295 lbs. It is specially constructed for heavy blacksmith's work and is provided with a deep fire box and powerful blast. It has adjustable legs, which may be suited to any uneven floor levels, and are held to a proper length by set screws and socket hubs. These portable forges are made in numerous sizes and suitable for all varieties of smith work.

Portable Forge.



Hand Blower.

The hand blower and tuyere iron, as represented, are sold independent of the forge. The frame work is of gas pipe bent to the required shape and is made stiff and firm, to maintain securely the positions of the several parts and bearings.

Abstract of Patents on the Compound Locomotive

IV.

The first part of this abstract was published in the *Railroad Gazette* of Feb. 13. For the tabulated list of patents the reader is referred to that issue.

XXXIII.—Pat. No. 430,969. (*American Patent.*) *Inventors Pitkin & Lane. Dated June* 24, 1890. Claim: 1. In a compound engine, and in combination with the usual communicating cylinders and their valves, a throttle controlling the steam delivery to both cylinders, a throttle controlling the delivery of steam to the large cylinder only, and connecting devices between said throttles, for operating them independently or jointly at will.

2. In a compound engine, the main steam pipe, its throttle, and the throttle-operating lever controlling the steam delivery to the high-pressure cylinder in combination with the branch pipe for delivering high-pressure steam to the low-pressure cylinder, the throttle of the branch pipe, its operating lever and devices whereby said levers may be connected or disconnected at will.

3. In a compound engine, the main throttle and lever, controlling the delivery of steam to both the high and low pressure cylinders, and a locking device to hold the lever, as usual, in combination with the secondary throttle and lever for admitting high-pressure steam directly to the low pressure

cylinder, and the toothed bar and catch connecting said levers.

4. In a compound engine, the steam pipe leading from the boiler to the high-pressure cylinder, and the main throttle-valve and its lever controlling said pipe, in combination with the branch pipe leading to the low-pressure cylinders, the throttle in the branch pipe, the piston and the cylinder to operate the second throttle, the steam pipe leading from the boiler to cylinder, the valve, the operating rod and lever, and the catch or locking device connecting said lever, with the main throttle lever.

TECHNICAL.

Manufacturing and Business.

The Steinhilber Combination Car Co., Chicago, has been incorporated to manufacture stock, freight and coal-chute cars. The capital stock is $500,000. The incorporators are: W. Fuller, M. B. Mills and George A. Fuller.

The Shultz Belting Co., St. Louis, Mo., report among the recent orders received one from the St. Louis & Suburban Railroad for two belts, each 72 in. wide and 154 ft. long. In addition to the above the firm has sold to the concern 10 generator belts, aggregating 700 ft. of belting, 16 in. wide.

The Universal Radial Drill Co., of Cincinnati, O., has recently shipped to the Homestead Steel Works, of Carnegie, Phipps & Co., Pittsburgh, one of its mammoth radial drills, 17 ft. high and weighing 16 tons, with a 9 ft. arm and 9 ft. 5 in. under spindle, for boring armor plate.

Gen. N. H. Farquhar, Washington, D. C., will receive sealed proposals until June 17 for constructing two cranes, one for the United States Navy Yard, Brooklyn, N. Y., and one at the Navy Yard at Norfolk, Va.

The Cable Iron Car Roofing Co., of East St. Louis, has been incorporated in Illinois, with a capital stock of $30.000.

The Hunter Steel Co., of Chicago, capital stock, $500,000, has been chartered in Illinois for the manufacture of steel castings. The incorporators are: Mason S. Frost, John C. Poller, and Edward I. Frost.

Mr. Edward Hill has been appointed the Western representative of the Pickering Spring Co., Ltd., of Philadelphia. His office will be at No. 719 Phenix Building, Chicago.

Byram & Co., of Detroit, Mich., the manufacturers of the well-known Colliau cupola, which has had an extensive sale in this country, have recently received an order for one of their furnaces complete for shipment to England.

Iron and Steel.

Bids were opened at the War Department at Washington, April 30, for 16 sets of steel mortar castings and forgings. The Midvale Steel Co.'s bid was 36 cents per lb. for the castings for carriages, and 74 cents per lb. for steel forgings for the mortars. The Bethlehem Co. bid 65 cents per lb. for the forgings.

The plant of the Reliance Steel Casting Co. at Pittsburgh, manufacturers of steel castings of all kinds, is being operated to its full capacity. A machine shop department added to this plant some time ago, is now in full operation.

A fire in the steel works at Breaker Island, Troy, N. Y., May 4, caused a loss of $400,000. Seven Westinghouse engines were destroyed. Nearly 1,000 people will be deprived of work.

The Ætna furnace property at Ironton, O., has been sold by the United States marshal to Joseph S. Clark and John H. Barnes, of Philadelphia, representing the holders of the first mortgage bonds, for $266,000. The sale also includes the Sarah and Vesuvius furnaces. and about 17,000 acres of mineral lands, the whole costing about $1,700,000.

The Spang Steel & Iron Co., of Etna, Pa., have just completed the specifications for a new department to be devoted to heavy government work. The new structure will occupy about two acres of ground, and work on the foundations for six open-hearth Bessemer melting furnaces and three heating furnaces will soon commence. The cost is estimated at $250,000.

The Apollo Iron & Steel Co., whose works are at Apollo, Pa., is erecting a new building, equipped with the best modern machinery for the manufacture of black sheet iron.

The Slatington Rolling Mill Co., of Slatington, Pa., has been reorganized as follows: David Williams, President; W. P. Hopkins, General Manager; H. F. Hall, Treasurer, and S. De Long, Secretary. The company makes a specialty of high grade iron, stay bolts, rivet iron, etc.

The Mary Pratt Furnace Plant, at Birmingham, Ala., will be sold by Receiver Z. L. Nabers, on June 2.

The Cambria Iron Co., of Johnstown, Pa., is soon to make a test of the Adams direct steel process, a furnace for this purpose being now in course of construction over furnace No. 3 in the open-hearth department.

The Rail Market.

Steel Rails.—About 6,000 tons of rails are known to have been ordered this week, 4,000 tons being taken by an Eastern mill. Quotations are: $30.75 at New York, $30 at Pittsburgh, and $31 at Chicago.

Old Rails.—Few sales are reported, the quotations at New York remaining $21.75 for American tees. At Pittsburgh old iron rails have sold for $24, and steel rails at $17.75.

American Compound Locomotives for Brazil.

The Baldwin Locomotive Works have received an order for 20 compound locomotives for export to Brazil. The order comprises six different classes of locomotives, half being for broad-guage lines and half for narrow-gauge lines. There are four 65-ton consolidation freight locomotives, three 50-ton express passenger locomotives and three 50-ton mogul locomotives for the standard-gauge lines, and the same number of engines and the same types for the narrow-gauge lines. The Baldwin works have built or have under order at this time 40 compound locomotives, and they have assumed a regular place in their output. The firm is providing by special machinery for the rapid and economical finishing of the compound cylinders.

The Chignecto Ship Railroad.

Two gangs of men are now engaged on the Amherst lifting dock, where the masons resumed work April 24. Two ballast trains and about 300 men have been at work for the last three weeks at the end of track, and another force is at work in the heavy cutting that stopped tracklaying last fall. The working season hardly begins before May 1, and consequently the summer's work is not fairly started.

Tubular Frame Cars in England.

The Tubular Frame Wagon Co., Ltd., has secured possession of the Vulcan Steam & Forge Works, in Barrow, England, and will proceed to building cars of the tubular type. Mr. M. R. Jefferds is General Manager of the company. Heretofore this company has contracted its orders out to other builders. The company has orders on hand for over 2.000 cars. It is stated that it will put in a tube mill and will make its own castings, the malleable iron, as well as the others. The timber will be imported from the United States. The capacity of the works will be about 20 cars a day.

Oberlin Smith's Contribution.

Oberlin Smith, of Bridgeton, N. J., has sent to the Grounds and Buildings Committee of the Columbian Exhibiton, at Chicago, the design of a 600-ft. tower, upon which there is to be pivoted an oscillating beam 1,100 ft. long. At each end of this beam there are to be suspended two globes 100 ft. in diameter in which visitors are to admitted and raised 1,100 ft. from the ground.

The Conventions.

The Executive Committees of the Master Car Builders and Master Mechanics' Associations met in New York yesterday to consider, among other things, the practicability of making a change in the place for holding the conventions this summer. As the *Railroad Gazette* goes to press Thursday, we cannot give the result of their meeting, but it does not seem probable that the place of meeting will be changed at this late date, although there is a great deal of dissatisfaction with the outlook for securing accommodations at reasonable rates. The difficulty may, perhaps, reduce somewhat the attendance at the conventions, but the conventions have become already too well established to be anything but successful, wherever they are held.

Incidentally it has been suggested that Mr. E. S. Canman, general representative of the Hale & Kilburn Mfg. Co., might be prevailed upon to give an exhibition of magic at the conventions. He is said to be one of the cleverest magicians in the country, and probably the amusement committee could do no better than to secure his services for an evening.

The Brooklyn Bridge Terminals.

Sealed proposals will be received by the trustees of the New York & Brooklyn Bridge at their office, 179 Washington street, Brooklyn, N. Y., up to May 11, for the steel and iron structures required for the extension of the railroad platform in Brooklyn and of the roadways in New York. Specifications may be had and general descriptive drawings examined upon application at the engineer's office, 179 Washington street, Brooklyn.

Gas for Postal Cars.

The Richmond & Danville is now running postal cars between Atlanta and Washington, lighting them with Pintsch gas. The supply from the Atlanta works runs the round trip. The Baltimore & Ohio is also arranging for the equipment of its postal cars with this light. This is certainly a decided step ahead, when we consider the large amount of mail which has been destroyed by fire, and the further fact that postal clerks have been required to work by dim lanterns entirely inadequate to the difficult service they have to render.

THE SCRAP HEAP.

Notes.

The strike at the shops of the Michigan Car Works failed, many men returning to work April 30.

The New York Central has reduced the wages of certain switch-tenders who were getting $50 and $55 a month.

It is said that the postal system on the Lake Shore & Michigan Southern has been badly crippled through the six lives lost in the recent accident at Kipton and the resignation of 11 other clerks since that time.

Four men were killed by trains on the New York Central near Fishkill in one day recently, and the company set officers at work to arrest trespassers. Eleven men were arrested May 2 and tried in the local court. Six paid the $5 fine and five were imprisoned for ten days each. The penalties were apparently very light; though, from previous reports, it would seem that it is necessary to kill a few track trespassers before even a mild sentence can be secured.

A St. Paul paper says that the Northern Pacific, in the construction of its sleeping cars for the transcontinental service, has put a check upon the deliberate selfishness with which many a woman will take possession of the dressing room in the morning and hold it against all comers while she goes through an elaborate toilet. There are no locks to the dressing-room doors. A curtain is hung inside the door, so that the interior of the room andits occupants are satisfactorily screened even if the door be opened.

Car Inspectors' Association.

"A dispatch from Columbus, O.," says that "The National Car Inspectors" held their first annual convention there April 22, there being 40 delegates from different states. The principal matter under discussion was the advisability of amalgamating with the Brotherhood of Car Men, an organization west of the Mississippi River with 32 lodges and 2,700 members. The Car Inspectors' Association has 21 lodges and 1,400 members.

The "Ames" of Two Counties.

In a recent issue we published the substance of a press dispatch detailing some of the troubles of the Kentucky Union Railroad. The accounts stated that the aggregate damage done by irate employes was $50,000. How much the figures were exaggerated we do not know, but that the men were thoroughly mad, and determined to prepare "brakers," is evident from the following verbatim copy of a notice that is said to have been posted near the line of the road:

TEN DAYS

NOTIES TO THE

K. U. R. R. Compny We the under Siners have bin waiten for our money as long as we ame to We ame to have our money or the KU. RR has to Stop rolen hear Wheels thrue Lee Co & Breathet Co MONEY is what we mean Money is what we want & money is what we ame to have OR the KU. RR. look for brakers. this noties call for all of the back money that the K U owes Lee Co & Breathet Co a gauts April 1st 1891 if not paid the Local & pasengr betr Stay below the line money is what we want & then we are a friend to the K U. RR.

Breathet Co
& Lee Co
March 20th, 1891

A Track Circuit Without Battery.

An engineer on the Delaware, Lackawanna & Western says he was coming down the Chenango Valley when the recent storm burst. A vivid flash of lightning startled him, but he was not prepared for what followed. A huge ball of fire was seen on one of the rails coming rapidly toward the locomotive. He shut off steam and reversed the engine. The lightning, which looked like a liquid ball of fire about the size of a 12-in. football, struck the driving wheels of the locomotive and, after running several times around them, crossed over on the axles to the opposite side of the track and went spinning away in the direction from which it came and vanished around a distant curve. The engine was not damaged, with the exception of the glass oil cups on the side rods, which was broken, and the paint on the drivers were blistered.—*Binghamton Herald.*

The "several times around the driving wheels" was thrown in for good measure and to avoid the embarrassment of an encore.

Railroad Development in the Canadian Northwest.

In his annual report to the Dominion parliament, just issued, the Minister of the Interior devotes a chapter to railroad development in the Canadian Northwest. "There has been a good deal of discussion in parliament," says the deputy minister, "respecting the estimates made in 1883 by Sir Charles Tupper, upon a short memorandum I had prepared for his information, as to the revenue likely to be derived from Dominion lands." The lands which the government intended selling at the date when this prediction was made have since either been thrown open for free homestead entry, as for example, the even-numbered sections in Southern Manitoba and the southwestern portion of the territories, or have been granted to colonization railroad companies. The total mileage of roads now actually constructed in Manitoba and the Northwest territories, for which free grants of land have been made since the date of the prediction referred to, is as follows:

Manitoba Southwestern, 212 miles; Manitoba Northwestern, 205 miles; Shell River branch of same, 11 miles; Canadian Pacific, Renmay & Melita branch, 75 miles; Canadian Pacific, Glenboro branch, 17 miles; Qu'Appelle, Long Lake & Saskatchewan, 248 miles; Northwest Coal & Navigation Co., 109 miles; Alberta Railway & Coal Co., 60 miles; Calgary & Edmonton to Red Deer, about 100 miles, and Northwest Central, 50 miles, a total of 1,087 miles.

Assuming the cost of constructing these lines to be not more than the value of the land subsidy at the regulation price (6,400 acres per mile, at $2.50 per acre, or $16,000 per mile), lands have been earned by these several companies to the amount of $17,400,000. In addition to this, there is prospect that the following companies will shortly have constructed the mileage set opposite the names: Calgary & Edmonton (remainder of line to Edmonton), 90 miles, and south to boundary, 150 miles; Northwest Coal & Navigation Co. to Crow's Nest Pass, 100 miles; Manitoba Northwestern to Prince Albert, 225 miles; Great Northwest Central (remainder of line to Battleford). 400 miles; Wood Mountain & Qu 'Appelle, 240 miles; Lake Manitoba Railway & Canal Co., 17 miles; Brandon & Southwestern, 17 miles; Red Deer Valley Railway & Coal Co., 55 miles; Lac Suel, 18 miles, and Manitoba & Southeastern, 110 miles; a total of 1,422 miles.

When this has been done the companies will be entitled under their charters to lands to the value, at $2.50 per acre, of $22,752,000.

In addition to these lines the Winnipeg & Hudson's Bay road has laid track on, but not quite completed. 40 miles. Assuming the length of this road to be 650 miles, and the land grant to be no greater in value than that to the other companies (although in the Northwest territories it is 12,800 acres per mile) the lands which will have been earned when the road has been built will be worth $10,400,000.

The following table of mileage may be of interest: Manitoba, 1,442 miles; Northwest Territories, 1,362 miles; British Columbia, 618 miles; a total of 3,422 miles.

Murder on a Passenger Train in Austria.

A passenger traveling from Cracow to Lemberg in a night express train, on the night of April 30, suddenly drew two revolvers, and with one in each hand demanded of his three fellow-travelers in the same compartment their money and valuables. A terrible struggle ensued. Although the men assailed were unarmed they fought with desperation. The robber used his revolvers with effect, killing two of the men in succession. The third grappled closely with his assailant, who fired in vain. Having emptied all the chambers of his revolvers the robber tore himself from his antagonist, burst open the door and jumped from the train while it was going at full speed. The train was backed to the vicinity of the spot where it is supposed the man jumped out, and a search was made, but without avail. No traces of him could be discovered.

The Farmers are not Uneasy.

The Carolina Central runs through the Big Swamp just east of Lumberton, N. C., on trestlework. Last Tuesday an army of caterpillars began moving out of the swamp, and when they reached the streams they proceeded to cross on the trestles. The rails and ties were covered several inches deep with the moving mass, and the first train that encountered them was brought to a standstill, the driving wheels of the engine slipping around as if the rails had been oiled. The engineer exhausted the contents of his sand box before he got through the swamp and reached a clear stretch of track. It was thought that trip would be the end of the caterpillar trouble, but the next day a train encountered another army of caterpillars crossing the trestle, and had the same difficulty. The Charlotte-bound passenger train yesterday had a similar experience. The rails and cross ties of the trestle were hidden from sight. The farmers on this side of the swamp express no uneasiness for the safety of their crops so long as the advancing army persists in using the trestle, for none of them has got more than half way across before being overtaken by a train.—*New York Sun.*

Canadian Railroad Returns.

The report for 1889 of the Dominion Minister of Railways and Canals, just laid before Parliament, shows that the number of railroads, including the government roads, in actual operation in Canada was 50. The number of miles of road completed, irrespective of sidings, was 13,325, 12,539 being laid with steel rails. There were 12,628 miles in actual operation. The paid-up capital amounted to $760,576,446. The gross earnings of all the lines amounted to $42,149,615, and operating expenses to $31,038,045, and net earnings $11,111,070. The number of passengers carried was 12,151,051, and 17,928,626 tons of freight were conveyed. The total number of miles run by trains was 38,819,380. The statement of receipts and

expenditures of the lines operated by the government last year is as follows: Intercolonial 894 miles, expenditure $3,481,472, earnings $2,928,080, loss $553,392; Eastern extension 80 miles, expenditure $79,102, earnings $84,658, profit $5,556; Windsor branch 32 miles, expenditure $18,982, earnings $30,162; Prince Edward Island 211 miles, expenditure $266,485, earnings $160,971, loss $105,514, making a net loss of $642,170 on the 1,217 miles operated by the government. The earnings of the Intercolonial were $32,716 in excess of the previous year. The total cost of the road and equipment to date is $46,908,233. During the fiscal year ended June, 1890, the Dominion government paid out $1,678,195 in earned subsidies to railroads, and in the six months between that date and Dec. 31 last $683,089 additional. The total payments since 1883 amount to $8,424,076, not including the Canadian Pacific subsidies.

Russian Railroads in 1890.

The statistical report of the Ministers of Communications in Russia, just published, sets forth that, although the gross receipts have slightly diminished as compared with 1888 and 1889, the net receipts have been higher. The length of road in miles, with the passengers carried, freight transported in goods (62 per gross ton), and earnings, in roubles, for the past five years have been as below:

Year.	Miles of road.	Passengers.	Foreign, goods.	Earnings, roubles.
1886	16,388	34,330,633	2,548,495,241	222,087,481
1887	16,912	34,757,926	3,006,589,907	249,692,674
1888	17,422	36,773,818	3,331,011,092	279,444,317
1889	17,702	38,740,577	3,404,890,892	276,357,278
1890	18,158	39,754,241	3,423,540,291	275,830,889

Since the building of a trans-caspian road, Russian engineers have been recognized as very close to our own in their ability to construct long lines of railroad with clerity and economy, and the above table shows that they are approximating to our methods of operation, as they are handling an increasing traffic with reduced charges at an increasing profit. The State owns 5,338 miles of road and 12,820 miles are owned by companies. The largest increase of traffic, 22 per cent., was on the trans-caspian road.

LOCOMOTIVE BUILDING.

The Brooks Locomotive Works secured the order for the 20 locomotives for the Cleveland, Cincinnati, Chicago & St. Louis. The delivery is to be made by August.

The Lake Shore & Michigan Southern has begun receiving from the Brooks Locomotive Works a number of new mogul engines, part of its recent order.

The Baltimore & Ohio Railroad turned out two new passenger locomotives from its Mt. Clare shops at Baltimore this week.

The Rhode Island Locomotive Works shipped 12 locomotives from its works last week, three of them being for export to South America. The number included three ten-wheel locomotives, with 18 × 24-in. cylinders, 54-in. boilers and 54-in. wheels, for the Boston & Maine. The total weight of the engines loaded is 103,400 lbs., and the weight on the drivers 83,000 lbs. The three locomotives exported to South America are moguls with 15 × 20-in. cylinders and 44-in. driving wheels. They have 46-in. wagon-top boilers, and fireboxes 66⅛ × 21⅝ in. Three six-wheeled switching engines for the New York, Providence & Boston with 18 × 24-in. cylinders and 51-in. wheels. They have a 2,800-gallon sloping-back tank on channel-iron frames. Other orders included a mogul Forney with 17 × 24-in. cylinders for the International Coal Co., of Cape Breton, N. S. It has 54-in. driving wheels and a total wheel base of 29 in. It weighs 117,450 lbs. loaded, with 28,040 lbs. on the rear trucks, 9,480 lbs. on the front trucks and 8,000 lbs. on the drivers. An eight-wheel engine for the Narragansett Pier road has 17 × 24-in. cylinders, a 52-in. boiler with wagon top and 62-in. wheels.

CAR BUILDING.

The Fitchburg is building four passenger cars, and has begun work on 300 freight cars at the shops at Fitchburg.

The Pittsburg, Shenango & Lake Erie is having built by the Barney & Smith Mfg. Co., of Dayton, O., six first-class passenger coaches equipped with the Scarritt high back seats.

The Savannah, Americus & Montgomery is reported to be in the market for 200 cars, the Silver Springs, Ocala & Gulf for 100 and the Orange Belt for 200 freight cars.

At the Columbus shops of the Pennsylvania there are being built 227 box, 60 stock, 40 gondola and 90 platform cars.

Blaine Bros., of Palatka, Fla., are building 20 platform and stock cars for the circus train of John Robinson.

BRIDGE BUILDING.

Albany, Or.—The joint committee, to select the site and design of bridge to be built across the Williamette at Albany met April 22. The final report of the engineer was presented. The plan of the steel bridge to be built at Catapoola street was adopted. The estimated cost of the bridge is $99,700.

Atlanta, Ga.—Sealed proposals for building and erecting a steel bridge along the line of Forsythe street, from Marietta street to Alabama street (in all a distance of about 655 ft.), will be received by the Mayor and General Council of Atlanta until Monday, June 15. Plans and specifications can be seen at the office of R. M. Clayton, City Engineer.

Beech Creek, Pa.—The County Commissioners propose to erect a bridge at this place.

Colorado Springs, Col.—The Common Council, the Denver & Rio Grande, and the Chicago, Rock Island & Pacific have agreed to plans for a viaduct to be built across the railroad tracks.

Columbus, O.—The Columbus, Hocking Valley & Toledo Railroad has contracted with the Detroit Bridge Co. for four iron bridges to be placed on the Hocking division.

Cuttingsville, Vt.—The Vermont Construction Co., of St. Albans, Vt., recently built a 100-ft. iron bridge over the Mill River, one mile north of Cuttingsville.

Hyattsville, Md.—A new road is being opened from Hyattsville westward to the Vansville road. A bridge will be constructed across the eastern branch, and the expenses of the work will be paid by voluntary subscription.

Little Rock, Ark.—The contract for the county bridge which is to be built over the Arkansas River at Little Rock, has been finally approved by all the commissioners. The bridge will be constructed by A. J. Tullock, proprietor and engineer of the Missouri Valley Bridge & Iron Works of Leavenworth, Kan. The structure is to be a high bridge, being 50 feet above high water. It will be built entirely of steel resting on masonry piers placed in position by pneumatic process. The entire work is to cost $275,000.

Madison, Ind.—Proposals are wanted, until May 21, for the construction of a bridge at Madison by James H. Crozier, Auditor.

Mays Landing, N. J.—Work on the new Mullica River bridge, connecting Atlantic and Burlington Counties at Chestnut Neck, will begin at once. The contract was awarded by the Board of Chosen Freeholders of both counties, to the Groton Bridge Manufacturing Co., of New York. The bridge is to be 720 ft. in length, with a 60 ft. draw in the clear. The piers will be wrought-iron cylinders, 5 ft. in diameter, filled with concrete and resting on and extending over piling in the bed of the river. The abutments will be built of stone. The roadway will be 16 ft. wide, with a guard rail 4 ft. high. The cost of the bridge will be $30,650.

Nashville, Tenn.—The Louisville & Nashville is rapidly replacing the old bridges between Nashville and Columbia with substantial iron structures. Two of these bridges will be completed in a few days, and the material for the others is on the ground ready for setting up.

New York City.—The Secretary of War has approved the report of the Board of Engineers on the construction of the bridge authorized by Congress across the North River from New York City to Hoboken, N. J. The board recommended that the bridge should not be less that 150 ft. high.

Nova Scotia.—The provincial government of Nova Scotia introduced the following bill, to make further provision for the construction of bridges, in the house of assembly last week. The act proposes to extend the larger bridge service of the province to the extent of $300,000. Of this amount $250,000 is appropriated to the following counties: Annapolis, $11,906; Antigonish, $10,713; Cape Breton, $18,753; Colchester, $18,368; Cumberland, $21,494; Digby, $11,712; Guysboro, $16,391; Halifax, $12,940; Hants, $15,283; Inverness, $13,434; Kings, $15,635; Lunenburg, $10,008; Pictou, $23.318; Queens, $9,749; Richmond, $9,083; Shelburne, $10,922; Victoria, $10,424, and Yarmouth, $9,857. The sum of $50,000 is appropriated for the construction or repair of bridges in the several counties as follows: Cape Breton, $15,000; Lunenburg, $10,000; Colchester, $13,000, and Inverness, $12,000.

Ohio.—Bills have been introduced in the legislature to authorize Toledo to issue $5,000 in bonds for bridge purposes and to authorize the commissioners of Belmont County to issue $50,000 in bonds for bridge purposes.

Pittsburgh, Pa.—The County Commissioners have let contracts for the iron superstructure of seven bridges to the Massillon Bridge Co. on the following bids: Bridge over Little Deer Creek, $890; Lowries Run, $780; Abers Creek, $1,250; Poketos Creek, $1,300; Little Bull Creek, $890; Deer Creek, $790; Streets Run, $780.

Pottstown, Pa.—The Philadelphia Bridge Works of Cofrode & Saylor, have just received the following important orders: For the Philadelphia & Reading Railroad, 20 girder and truss bridges on the Port Reading extension; for the New York Central Railroad, three large plate girder bridges on the Rome, Watertown & Ogdensburg division; for the Central of New Jersey, three bridges, two of which are for six tracks; for the Pennsylvania road, two bridges at Trenton, N. J.; also a large iron machine shop to be built at Jersey City.

Shandaken, N. Y.—The bill authorizing this town to pay for an iron bridge across the Esopus Creek has become a law.

Ventura, Cal.—The Supervisors have called an election for May 23, to vote on the question of issuing bonds in the sum of $75,000, for building a bridge over the Santa Clara River.

Waxahachie, Tex.—The Missouri, Kansas & Texas railroad bridge accross Chambers Creek, which was washed away by the heavy rains, has been replaced.

Youngstown, O.—The County Commissioners have decided to erect an overhead bridge across the river in the eastern part of the city which will cost complete nearly $100,000. It will pass over several railroads which contribute a certain amount to its erection.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Pennsylvania, semi-annual, 3 per cent., payable May 29.

Petersburg, 3 per cent. on the common stock, payable May 1.

Rome, Watertown & Ogdensburg, quarterly, 1¼ per cent., payable May 15.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Atlantic & Pacific, annual, 45 Broadway, New York City, May 21.

Burlington, Cedar Rapids & Northern, annual, Cedar Rapids, Ia., May 26.

Canadian Pacific, annual and special, Montreal, P. Que., May 13.

Cheshire, annual, Keene, N. H., May 13.

Chicago, Burlington & Quincy, annual, Chicago, Ill., May 20.

Cleveland, Lorain & Wheeling, annual, Cleveland, O., May 13.

Concord & Montreal, annual, Concord, N. H., May 26.

Delaware & Bound Brook, annual, Trenton, N. J., May 28.

Delaware & Hudson Canal, annual, 21 Cortlandt street, New York City, May 12.

Denver & Rio Grande, annual, Denver, Col., May 26.

Detroit, Lansing & Northern, annual, Detroit, Mich., May 13.

Dutchess County, annual, adjourned 35 Broadway, New York City, May 11.

Flint & Pere Marquette, annual, East Saginaw, Mich., May 20.

Fremont, Elkhorn & Missouri Valley, annual, Chicago, Ill., May 22.

Indianapolis & Vincennes, annual, Indianapolis, Ind., May 14.

Kansas City, Arkansas & New Orleans, annual, Beebe, Ark., May 21.

Manhattan (Elevated), special, 71 Broadway, New York City, May 27, to consider a proposed increase of the capital stock.

Missouri, Kansas & Texas, annual, Parsons, Kan., May 20.

New York & Harlem, annual, Grand Central Station, New York City, May 19.

Northern (New Hampshire), annual, Concord, N. H., May 28.

Ohio River, annual, Parkersburg, W. Va., May 14.

Pittsburgh, Fort Wayne & Chicago, annual, Pittsburgh, Pa., May 20.

Pittsburgh & Western, special, corner of Anderson street and River avenue, Allegheny, Pa., May 21, to act upon a proposed issue of bonds.

Quebec & Lake St. John, annual, Quebec, P. Que., May 14.

St. Louis & San Francisco, annual, Broadway and Pine street, St. Louis, Mo., May 13.

Wisconsin Central, annual, Milwaukee, Wis., May 28.

Railroad and Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Society of Civil Engineers* will hold its next annual convention at Lookout Mountain, near Chattanooga, Tenn., commencing May 20.

The *Association of American Railway Accounting Officers* will hold its annual convention at the Southern Hotel, St. Louis, Mo., May 27, commencing at 10 o'clock a. m.

The *American Institute of Mining Engineers* will hold its next meeting at Cleveland, O., June 2.

The *Master Car Builders' Association* will hold its annual convention at the Stockton Hotel, Cape May, N. J., commencing June 9, at 10 o'clock a. m.

The *American Railway Master Mechanics' Association* will hold its annual convention at the Stockton Hotel, Cape May, N. J., beginning at 9 a. m., June 16. Members wanting rooms reserved are requested to apply to the Secretary.

The *New England Railroad Club* meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at the rooms of the Central Traffic Association in the Rookery Building, Chicago, at 2 p. m.

The *New York Railroad Club* meets at its rooms, in the Gilsey House, New York City, at 2 p. m., on the third Thursday in each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, the fourth Wednesday of January, March, May, September and November.

The *Northwest Railroad Club* meets on the first Saturday of each month, except June, July and August, in the St. Paul Union Station, at 7:30 p. m.

The *Northwestern Track and Bridge Association* meets on the Friday following the second Wednesday of each month at 7:30 p. m. in the directors' room of the St. Paul Union Station, except in the months of July and August.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at the American House, Boston, at 7:30 p. m. on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at 78 La Salle street, Chicago, at 8 p. m., on the first Wednesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the House of the Club, 1,122 Girard street, Philadelphia, on the first and third Saturday of each month, excepting in January, when the annual meeting is held on the second Saturday of the month. The second January meeting is held on the third Saturday. The club stands adjourned during the months of July, August and September.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Thaw Mansion, Fifth street, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month in the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the South* holds its monthly meetings on the second Thursdays at 8 p. m. The Association headquarters are at Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The *Denver Society of Civil Engineers and Architects* holds regular meetings at 36 Jacobson Block, Denver, on the second and fourth Tuesday of each month, at 8 o'clock p. m., except during June, July and August, when they are held on the second Tuesday only.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The *Civil Engineers' Association of Kansas* holds regular meetings at Wichita on the second Wednesday of each month, at 7:30 p. m.

The *American Society of Swedish Engineers* holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

The *Engineers' Club of Minneapolis* meets the first Thursday of each month in the Public Library Building, Minneapolis, Minn.

The *Canadian Society of Civil Engineers* holds regular meetings at its rooms, 112 Mansfield street, Montreal, P. Que., every alternate Thursday except during the months of June, July, August and September.

The *Technical Society of the Pacific Coast* holds regular meetings at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., at 8 p. m. on the first Friday of each month.

American Society of Civil Engineers.

At the meeting of May 6 the following were elected:

Members.—William Albert Allen, Chief Engineer Maine Central; Edward Burr, First Lieut. Corps of Engineers U. S. A., Cascade Locks, Ore.; George Dowman Fitz Hugh, Consulting and Examining Engineer Louisville & Nashville R. R., Birmingham, Ala.; Charles Webster Gay, City Engineer, Lynn, Mass.; Robert Giles, Locating Engineer A., T. & S. F. R. R., Topeka, Kan.; Howard Hill Jackman, City Engineer, Wichita, Kan.; Andrew Dempster Whitton, Chief Engineer Philadelphia Traction Co.; United States Construction Co.; Philadelphia and Pittsburgh Traction Co., Philadelphia, Pa.; Frederick Christian Holberg Arentz, St. Louis, Mo.; William Ashburne Cattell, Assistant Chief Engineer L. I. R. R., Long Island City, N. Y.; Harry Frease, Chief Engineer, Valley Ry., Cleveland, O.; Thomas Henry Grant, Assistant Engineer Maintenance of Way N. J. Central Division P. & R. R. R., Red Bank, N. J.; William Dean Janney, Div. Engineer Ohio River Div. N. & W. R. R., Ceredo, W. Va.; Richard Lamb, Norfolk, Va.; Fred Morley, Instructor in Engineering Department of Michigan University, Ann Arbor, Mich.; Theodore Starrett, Chicago, Ill.; Edmund Coffin Stout, partner with Chas. H. Haswell, Engineering and Surveying, New York City; George Copeland Urquhart, Assistant Engineer in charge construction Maintenance of Way Dept. P. C. & St. L. Ry., Steubenville, O.; Sigmund von Gemmingen, with Eggleston & Dennis, Civil Engineers, Richmond, Va.; Edwin Hall Warner, Warner & Warner, Civil and Mining Engineers, Seattle, Wash.; Edward Harris Goodman, President and General Manager of the Union Switch and Signal Co., Swissvale, Pa.

Juniors.—William Sheldon Humphrey, Bridge Engineer, Bridge and Building Department Missouri, Kansas & Texas Ry., Sedalia, Mo.; Wm. Bradford Jewett, New Rochelle, N. Y.; Clifford Neville Miller, Covington, Ky.

New England Railroad Club.

The regular meeting of the club will be held at the United States Hotel, Boston, Wednesday, May 13, 1891, at 7:30 p. m. The rules for interchange of freight cars will be the subject for discussion.

Railroad Surgeons.

The National Association of Railway Surgeons met in Buffalo, N. Y., last week, 150 members being present. The officers for the ensuing year are: President, Dr. J. H. Murphy, of St. Paul; Vice-Presidents, Dr. C. H. Conn, of Concord, N. H.; Dr. B. L. Hoovey, of Rochester; Dr. J. C. Hearne, of Hannibal, Mo.; Dr. George Ross, of Richmond, Va.; Dr. G. W. Coit, of Missouri Valley, Ia.; Dr. B. F. Eads, of Marshall, Tex., and Dr. S. C. Benedict, of Athens, Ga.; Secretary, Dr. E. R. Lewis, of Kansas City; Treasurer, Dr. R. Harvey Reed, of Mansfield, O.

PERSONAL.

—Mr. Creed Haymond, who has been at the head of the law department of the Southern Pacific Co. for the last 20 years, has retired. Mr. Haymond has been abroad for the last six months and is now traveling in Europe.

—Mr. C. M. Fuller, of Boston, has been appointed General Agent of the Jackson Electric Engine and Telephone Co. Mr. Fuller was for many years Southern Agent of the Eames Vacuum Brake Co., with headquarters at Atlanta, Ga.

—Mr. William H. Morrill died at his home in Dedham, Mass., this week, aged 70 years. He was for many years the General Freight Agent of the Boston & Providence, but resigned that position when the road was leased to the Old Colony road.

—Mr. Charles D. Freeman, a prominent citizen of Philadelphia and a former President of the Camden & Atlantic, died in Philadelphia, this week, aged 71 years. Mr. Freeman was elected President of the Camden & Atlantic soon after the war and held the position until the line was purchased by the Pennsylvania.

—Mr. Robert M. Quayle, formerly Division Master Mechanic of the Chicago & Northwestern at Clinton, Ia., has been appointed Master Mechanic of the Milwaukee, Lake shore & Western at Kaukauna, Wis. Mr. Quayle's record on the Chicago & Northwestern indicates that he will fill the new position to the entire satisfaction of his employers.

—Mr. Joseph Crawford, Superintendent of the New York Division of the Pennsylvania, was severely injured at the work on the new train shed in Jersey City last week. A heavy plank, knocked out of a scaffold by an iron beam, struck Mr. Crawford, who sustained a compound, comminuted fracture of the left leg, the injury being below the knee. It was thought at first that the leg would have to be amputated but the physicians now have strong hopes of saving it.

—Mr. S. B. Haupt, Superintendent of the Roanoke Machine Works and Superintendent of Motive Power of the Norfolk & Western, has tendered his resignation of both positions, to take effect June 1. Mr. Haupt has been Superintendent of the Roanoke Machine Works since 1883, and Superintendent of the Motive Power department of the Norfolk & Western since 1885. He was connected with the mechanical department of the Pennsylvania for some years, and was Assistant Master Mechanic of the shops at Altoona, when he resigned to go to the Norfolk & Western.

—There came from Boston a week or two ago a somewhat remarkable news item, which, in view of the comments made by those who have read it, needs a word of explanation. It was to the effect that Mr. Arba G. Hyde, a veteran passenger conductor on the Boston & Albany, who recently died, had left $50,000 to found a free library in Stafford, Conn., his early home, the money being, however, subject to the use of his wife and sister during their lives. Nearly or quite every one who reads this item seems to regard it either as a mistake or as a piece of news which can be characterized as broad irony. We will not stop now to comment either on the morals of conductors generally or on the state of public opinion and the vicious trend given to it by the education it has received through the humorous columns of the newspapers, but the simple fact that Mr. Hyde in all probability got his money as honestly as any man ever did ought to be chronicled. People who assume that every conductor does steal base their opinion on the fact that every conductor has a good chance to steal; but the most cynical will admit that there are exceptions, and this is one of them. Mr. Hyde had run the best train on the road for many years. He was one of the most scrupulous men, abstemious and frugal in his habits and uniformly honorable in his dealings with everybody. The Boston & Albany does not find itself in need of spotters' services so often as many roads do, and the strictness of its management, when taken in connection with the long service of most of its conductors, is good presumptive evidence that not much stealing is done on its trains. Moreover, it is a fact that honest or dishonest dealing is partly a matter of habit, as well as of native character, and Mr. Hyde was, for several years before he became conductor, an express messenger, which is a business that trains a man in the habit of not treating other people's money as his own simply because it is in his hands. The foregoing is to the writer ample evidence of Mr. Hyde's uprightness, because it is simply confirmatory of the knowledge gained by 30 years' acquaintance; but to the wholly faithless it may be added that he received about $10,000—a moderate sum for the injuries sustained—in consequence of being badly hurt in a train accident about 1863, and that he bought Boston & Albany stock when it was much cheaper than it is now. He knew how to save money; and it must now be added that he had good judgment as to how it ought to be used.

ELECTIONS AND APPOINTMENTS.

Adirondack Extension.—The directors for the first year are: R. Suydam Grant, James C. Hunt, Robert Olyphant, Chester Griswold, C. A. Walker, and Wm. Strong, New York City; David Willcox, New Brighton, N. Y.; W. W. Durand, North Creek, N. Y.; I. H. Smith, Brooklyn; Horace G. Young, Albany; Jas. Roosevelt, Hyde Park; Warner Miller, Herkimer; J. Murray, Olyphant. C. A. Walker subscribes for 1,200 shares of the capital stock.

Baltimore & Lehigh.—The York & Peachbottom road has been reorganized under this name, and the following directors have been elected: Wm. Gilmor, President, and Charles R. McConkey, Frank G. Metzger and M. H. Houseman.

Burton Stock Car Co.—J. F. Wares is now the General Manager of the company, with headquarters at the company's office, No. 558 Rookery Building, Chicago.

Central Ohio.—The annual meeting of the stockholders of the company was held in Columbus, O., last week. The following board was elected: G. C. Hoover and James H. Collins, Columbus, O.; John Hoge, David Lee, Zanesville, O.; Charles H. Kibler, Newark, O.; John R. Hall, Quaker City, O.; W. W. Peabody, Cincinnati, O.; Daniel C. List, Wheeling, W. Va.; A. B. Crane, Osmun Latrobe, Joshua G. Harvey, Joseph M. Jenkins, Walter B. Brooks, Baltimore. The board organized by electing the following officers: James H. Collins, President; P. C. Sneed, Secretary; W. H. Ijams, Treasurer, and W. T. Thelin, Auditor.

Chesapeake & Ohio.—J. A. Quinn has been appointed Master Mechanic of the Clifton Forge Shop and Terminal, having jurisdiction in all matters pertaining to the department at that point.

Chicago, Milwaukee & St. Paul.—E. S. Keeley has been appointed Assistant General Freight Agent of the road at Chicago, to succeed J. L. Kellogg.

Cincinnati, Hamilton & Dayton.—The following appointments have been made: J. E. Gimperling, Superintendent, headquarters at Dayton, O.; C. N. Cory, Superintendent of Motive Power, headquarters at Lima, O.; J. B. Porter, Engineer Maintenance of Way, and W. J. Mulvihill, Chief Accountant, headquarters at Cincinnati.

Cincinnati & Muskingum Valley.—T. H. B. McKnight has been appointed Treasurer of this company in place of John E. Davidson, resigned.

Cincinnati, Wabash & Michigan.—C. H. Doebler has been appointed Master Mechanic, vice S. B. Tinker deceased. He will have charge of the motive power and equipment, with headquarters at Wabash, Ind.

Columbia Railway & Navigation Company.—The officers of the company are: A. M. Cannon, President; Paul F. Mohr, Vice-President; B. H. Bennett, Treasurer; J. R. Allen, General Manager; W. Lair Hill, General Counsel; Conrad N. Jordan, 41-43 Wall street, is the New York representative of the company. The principal office is at Tacoma, Wash.

Corpus Christi & South America.—At a meeting of the stockholders at Corpus Christi, Tex., April 30, the following directors were elected: J. S. Anthony, G. H. Towle, N. Gussett, E. H. Ropes, W. H. Weimer, J. J. Sullivan, R. J. Kleberg, L. W. Rankin and J. B. Armstrong. Col. E. H. Ropes was re-elected President, and N. Gussett, Treasurer.

Denver, Apex & Western.—The following have been elected as the permanent officers: H. A. W. Tabor, President; William C. Miller, Vice-President and General Manager, and William G. Smith, Secretary and Treasurer. The Chief Engineer has not been appointed yet. The office is in the Tabor Opera House Block, Denver, Col.

Eastern Minnesota.—W. A. Carpenter has been appointed General Freight and Passenger Agent. Mr. Carpenter has been connected with the Detroit, Lansing & Northern for over 15 years, for a number of years as General Freight Agent.

Florida, Central & Peninsular.—This company has purchased at judicial sale the railroad, rolling stock and other properties of the Tavares, Orlando & Atlantic railroad, and the same has been merged into and is now operated as a part of this company's system.

Florida Southern.—C. H. Bent, Assistant Superintendent of the Charlotte Harbor Division, having been appointed Superintendent of the Indian River Steamboat Co., Robert Gamble has been appointed his successor as Assistant Superintendent of this road.

Franklin & Abbeville.—The annual meeting of the stockholders was held at Franklin, La., May 2, and the following directors were elected: A. Baldwin, J. M. Burgueres, T. Sully, D. Caffery, John Barclay. The office has been removed from Franklin to Abbeville.

Great Falls & Canada.—The directors held their annual meeting at Great Falls, Mont., last week, and elected Sir A. T. Galt, President; T. S. Collins, Vice President; W. A. Barr, Secretary and Treasurer. The old board of directors was re-elected.

Gulf, Colorado & Santa Fé.—H. R. Irvine has been appointed Superintendent of Tracks, Bridges and Buildings, with headquarters at Galveston, Tex. P. T. Downs has been appointed Division Superintendent of the Northern Division, with headquarters at Cleburne, Tex., vice H. R. Irvine, promoted.

Hamilton & Kingston.—The following directors have been elected by the reorganized company: William H. Garland, President; H. J. Oberscheld, Treasurer; C. W. M. Love, Secretary; Crosby Johnson, and Thomas Ligon. The general office is in the Commercial Building, St. Louis.

Hannibal & St. Joseph.—The recent change extending the authority of W. C. Brown, General Manager of the Hannibal & St. Joseph and Kansas City, St. Joseph & Council Bluffs over the St. Louis, Keokuk & Northwestern, will result in several further changes. These have not been announced but it is believed they will include the following: Col. A. C. Dawes will be General Ticket and Passenger Agent of the Missouri lines of the system, and transferred from St. Joseph to St. Louis. Howard Elliott, General Freight and Passenger Agent of the Keokuk line, will be made General Freight Agent, with offices at St. Louis. C. M. Carter, present Auditor of the two main lines, will be made Auditor, with headquarters in St. Joseph. S. E. Crance will be made General Superintendent of the Western division, succeeding G. M. Hohl. These changes have not been announced officially.

Hearne & Brazos Valley.—The following officers were elected at a meeting at Hearne, Tex., recently: President, T. C. Westbrook; Secretary and Treasurer, W. P. Ferguson; General Manager, H. K. Davis, and Vice-President, H. B. Easterwood. The principal office will be at Hearne, Tex.

Jacksonville, Tampa & Key West.—Robert Gamble having been appointed Superintendent of the Florida Southern, the position of Master of Transportation has been abolished, and that of Train Master created. E. S. Spencer, Chief Train Dispatcher, has been promoted to the position of Train Master, and A. G. Whitney to be Chief Train Dispatcher.

Kansas City, Memphis & Birmingham.—L. R. Van Diver has been appointed Division Freight Agent to succeed O. G. Parsley, with headquarters in Memphis, Tenn. Mr. Van Diver has been Commercial Agent to the road at Atlanta.

Lake Shore & Michigan Southern.—The annual meeting of the stockholders was held in Cleveland, O., May 6. W. K. Vanderbilt, S. F. Barger and Hamilton McK. Twombley, of New York, and C. M. Reed, of Erie, Penn., were re-elected directors.

Mexican Central.—The annual meeting was held in Boston, May 6, the old board of directors being elected, with the exception that S. W. Reynolds succeeds the late Levi C. Wade. The directors organized as follows: President, S. W. Reynolds, Boston; Vice-President, Robert R. Simon, London, Eng.; Second Vice-President and General Manager, E. W. Jackson, City of Mexico; Clerk and Treasurer, J. T. Harmer, Boston; General Auditor (pro tem.), J. T. Harmer, of Boston; Assistant Treasurer, Charles A. Browne, of City of Mexico; Auditor, W. A. Trott, City of Mexico.

Mexican Gulf, Pacific & Puget Sound.—The annual meeting of the stockholders of the company was held in Montgomery, Ala., recently, resulting in the election of the following directors: Daniel Macauley, L. A. VanPraag, A. Troy, Joseph Jones, S. M. Lewin, A. H. Cross and S. M. VanPraag. The directors elected the following officers: S. M. VanPraag, President; L. A. VanPraag, Vice-President; J. H. Cross, Secretary.

Mohawk Valley & Northern.—The following are the directors of the consolidated company, named in the charter filed at Albany, N. Y., last week: W. Seward Webb, H. L. Sprague, H. Walter Webb, George Bird, Frank G. Smith, Thomas L. James, John M. Toucey, Frederick W. Vanderbilt, Charles D. Flagg, Chauncey M. Depew, Edward M. Burns, James W. Husted and Arthur G. Leonard.

New York & South Beach.—The directors are: Frank H. Skeele, William J. Keeley, Louis Conrad, Brooklyn, N. Y.; Daniel G. Thompson, Stephen H. Gurteen, Charles D. Newton, New York, and James H. Moran, White Plains, N. Y.

North Carolina.—W. F. Kornegey, of Goldsboro, N. C., has been elected President of the road to succeed General R. F. Hoke, who was recently elected, but declined the position.

Pittsburgh, Cincinnati, Chicago & St. Louis.—In addition to the changes in organization mentioned last week the following officers have been appointed: John W. Lyon, Auditor of Freight Receipts, and William Parker, Assistant Auditor of Freight Receipts.

Pittsburgh, Shenango & Lake Erie.—The stockholders met at Greenville, Pa., April 29, and elected John Dick, Meadville, Pa., President, and Dumont Clarke, New York; Henry M. Dechest, Philadelphia; A. F. Henlin, W. G. Sargeant, E. S. Templeton, Greenville; Thomas H. Wells, Youngstown, O.; Allen M. Cox, Conneaut, O., and John E. Reynolds, Meadville, directors.

Pittsburgh, Washington & Southern.—At a meeting for organization held at Warrington, W. Va., May 5, T. M. Jackson was elected President, Thompson Strosnider, Vice-President; A. N. Prichard, Treasurer, and Charles W. Cowan, Secretary.

Pittsburgh & Western.—At the annual meeting in Pittsburgh, Pa., May 4, the following officers were elected: President, Henry W. Oliver, Pittsburgh; Vice-President, Anthony J. Thomas, New York; General Manager, J. V. Patton, Pittsburgh; Directors: John W. Chalfant, Allegheney, Pa.; William H. Singer, James D. Callery, M. K. Moorhead, Pittsburgh; Anthony J. Thomas, C. H. Coster, S. Spencer, and Solon Humphreys, New York.

Quincy Electric Freight.—The railroad committee has reported a bill to the Massachusetts Legislature to incorporate John Q. Adams, Henry L. Higginson, Charles H. Porter, W. G. A. Pattee, P. L. Saltonstall, G. E. Armstrong and J. R. Graham as the directors of this company.

Richmond & Danville.—W. G. Oakman having resigned as First Vice-President, heads of departments heretofore reporting to him now report directly to the President. John A. Rutherfurd has been elected Third Vice-President, with such duties as may from time to time be assigned to him by the President.

Rusk, New Birmingham & Dallas.—The following officers have been elected by this Texas company: E. C. Dickinson, President; R. A. Barrett, Vice-President; W. B. Slosson, Secretary; A. A. Simmons, Treasurer; Samuel I. A. Willson, Attorney; Theodore Miller, General Manager.

Southern Pacific.—The passenger and freight departments of the Coast Division have been merged into the corresponding departments of the Southern Pacific proper, and these changes cause the promotion of H. R. Judah to be Assistant General Passenger and Ticket Agent, and E. J. Martin to be Assistant General Freight Agent.

Texas & East Line.—J. H. Rowell, of Jefferson, Tex., has been appointed Auditor of the road. The Receiver, William M. Giles, has established the headquarters of the road at Greenville, Tex.

Toledo, Ann Arbor & North Michigan.—F. S. Chandler has been appointed Purchasing Agent for this company. The general offices are now located on the second floor of the Pythian Temple, corner Jefferson and Ontario streets, Toledo, O.

Union Pacific.—M. F. Egan, Master Mechanic at Denver, has been appointed Assistant Superintendent of the Colorado Division, with office at Denver. Mr. Sprague, of Omaha, has been appointed to succeed Mr. Egan as Master Mechanic. He has been in the office of the Superintendent of Motive Power and Machinery.

Wisconsin Central Lines.—The following offices of the company have been removed to the Grand Central Passenger Station, corner of Harrison street and Fifth avenue, Chicago. General Manager, S. R. Ainslie; General Superintendent, Gavin Campbell; Auditor, Thomas J. Hyman; Auditor of Disbursements, Edward Shearson; Auditor of Traffic, Robert C. Mann; Local Treasurer, R. W. Maguire; Purchasing Agent, Charles C. McLeod; Special Agent, Charles A. Herriman; and Car Service Agent, Edward A. Byrne.

E. R. Horn has been appointed Superintendent of the Chippewa, Ashland & Portgage Division, to succeed M. B. Cutter, who has resigned to become General Superintendent of the Newport News & Mississippi Valley Co. C. A. Lamoureaux has been appointed Superintendent of the St. Paul Division, with headquarters at St. Paul, Minn, to succeed A. R. Horn.

RAILROAD CONSTRUCTION,
Incorporations, Surveys, etc.

Adirondack Extension.—The charter of this company was filed in New York last week. It is proposed to build a road between North Creek, Warren County and Malone, Franklin County, 120 miles long, and extending through Warren, Essex and Franklin counties. The capital stock is $1,200,000.

Baltimore & Ohio.—The company will shortly begin to lay an additional track on the Metropolitan Branch from Kensington to Rockville, Md. The distance will be about five miles. This will give the road a double track from Washington to Gaithersburg, about 20 miles.

Basic City, West Virginia & Pittsburgh.—The charter of this company was filed in Virginia recently. The proposed road is to begin at Basic City, Augusta County, Va., near the intersection of the Chesapeake & Ohio and the Shenandoah Valley roads, and extend westerly through Staunton to a point on the West Virginia state line in Bath or in Shenandoah County. The organization of the company under the charter has not yet been effected. No surveys have been made and there is very little prospect of any portion of the line being built this summer. The office of the company is at Staunton, Va.

Beardstown, Fort Madison & Sioux City.—The charter of this company was filed in Illinois this week. It proposes to build a road from Beardstown, Ill., to Fort Madison, Ia., via Rushville and Macomb. The capital stock is $2,000,000, with an extension from Beardstown to Jacksonville. The principal office will be at Macomb, Ill.

Bridgeport & Decatur.—Morris R. Locke & Co., who have the contract for grading the road, are to begin a new survey from Decatur west to Bridgeport, Tex., 12 miles, early this month. The road connects with the Union Pacific, Denver & Gulf at Decatur, and extends to coal fields in Wise County, near Bridgeport, which are to be developed by the Wise County Coal Co. The road will probably be completed ready for traffic in a few months. C. E. Moore, of Detroit, Mich., will have charge of the surveys.

Canada Atlantic.—This company it is reported has decided to commence the construction this summer of the extension from Ottawa to Parry Sound, Ont., a distance of 250 miles. The first section to be placed under contract will extend from Parry Sound, east about 40 miles, but some work will also be done between Ottawa and Renfrew, Ont., this year.

Chicago & West Michigan.—A short branch is reported to be under construction from Grand Haven to Highland Park, Mich. It is to be completed by July 1.

Denver, Apex & Western.—The contracts for the grading and bridging on the first five miles of the line west of Denver, Col., have been let to Mulnix & Bell, of Denver. The work under contract is to be finished in 60 days. The location of the line has been made from Denver to Lookout Mountain Resort, and the surveys are well advanced on the balance of the line. The road is projected from Denver westerly to Idaho Springs, Col., a station on the Union Pacific about 40 miles distant. The route is through Villa Park, Downing, Golden, Mt. Vernon, Lookout Mountain Resort, Bergen, and Arnold's Parks. The road is a local enterprise, and will be built by Denver capitalists. The maximum grades will be 52.8 ft. per mile and the maximum curves eight degrees. It will be standard gauge, and laid with 65-lb. rails. One of the viaducts, a combination iron and wood structure, will be 4,000 ft. long. Besides this there are two or three iron bridges and three short tunnels.

Fidalgo City & Anacortes.—This road on Fidalgo Island, between Fidalgo City and Anacortes, Wash., is now finished, but will not be in regular operation until June 1. All the track was laid last year, and the contractors have transferred the road to the officers. It is about 12 miles long, and both steam locomotives and electric motors will be used. There are eight pile and framed trestles, one of which, near Anacortes, where the road runs for some distance parallel to the Northern Pacific, is 1¼ miles long. The maximum grade on the line is 500 ft. per mile, and there are curves of 30 degrees. D. P. Sanderson, of Fidalgo City, is Chief Engineer.

Florida.—Bills have been introduced in the legislature to incorporate the Lake City & Albion and to confirm to it a land grant, and to extend the time for the completion of the extensions of the St. Cloud Sugar Belt, and to continue its present franchises and grants.

Glen Hazel & Shawmut.—This road is projected by S. S. Bullis, of Olean, N. Y., as a logging road. It was incorporated in Pennsylvania last week to build from near Kettners to Daguscahonda, Pa. The road will connect with the New York, Lake Erie & Western and the Philadelphia & Erie, and will be only 15 miles long, and with no important work upon it. The engineering work has been done by engineers sent out by C. W. Bucholz, Chief Engineer of the New York, Lake Erie & Western. Mr. Bullis has no intention of letting contracts for any of the work at present.

Hamilton & Kingston.—The recent St. Louis purchasers of this road have decided to build the proposed extension north from Hamilton, Mo., but the route has not yet been located nor has the northern terminus of the extension been decided upon. The present proposal is to extend the road to a point near Cainesville, Mo., the southern termiuus of the Des Moines & Kansas City road, and it is probable that the terminus will be at that town. The line will be about 50 miles long. The surveys have not yet been made, and it cannot be stated through what points the road will pass until the project is further advanced.

Hearne & Brazos Valley.—The organization of this road was completed at a meeting of citizens of Hearne, Tex., and the Brazos Valley on April 30. The company is practically a reorganization of the Paris, Hearne, Brazos & Gulf, and succeeds to that line's surveys, rights of way and subscriptions. The charter has been modified, and it is now proposed to build only 12 miles of road from Hearne west. A new survey is to be made, and it is expected that contracts will be let soon after May 12, on which date the engineers are to to report. About $50,000 of the capital stock has been paid into the treasury. W. P. Ferguson, of Hearne, is Secretary and Treasurer.

Indiana Northern.—This road is being built to connect the four roads which now enter South Bend, Ind. It will be about one mile long and will be practically a belt line, connecting the tracks of the Lake Shore & Michigan Southern, Michigan Central, Vandalia Line and Chicago & Grand Trunk, which have separate stations in the town. The construction work is well advanced and the line will be in operation at an early day.

Lackawanna & Montrose.—The directors of the road at a meeting at Montrose, Pa., decided to advertise for bids for grading the balance of the line being from Heart Lake to Montrose borough, Pa.

Lewiston & Southeastern.—This company was organized at Lewiston, Idaho, last week, to build a road from Lewiston to the Seven Devils mining country, some distance southeast of the city. The road will be constructed as a branch of the Northern Pacific, extending the line that is being built by that company from Pullman to Lewiston.

Louisiana, Arkansas & Missouri.—Bids will be received until May 18 for the grading and timber work required for the construction and completion of this road and the Louisiana & Arkansas from a connection with the Arkansas Valley road at Trippe south to Delhi, La., a distance of about 81 miles. W. C. Agnew, 7 Martin Block, Little Rock, Ark., is Chief Engineer. A survey is now being made on the line south of Delhi in the direction of Bryan City, on the New Orleans & Northeastern road. The Central Louisiana Improvement Co. is building the road. Archer N. Martin, 45 Wall street, New York City, is President.

Louisville & Nashville.—The branch of the Clarksville Mineral, which is to be built to Cumberland Furnace, will probably be completed early in June. Trains will be running between Pond Station and Cumberland Furnace about June 15. The branch is six miles long, and leaves the main line at Vanleer, 10 miles north of Pond Station, Tenn., the terminus being at Cumberland Furnace, which is owned by the Southern Iron Co. The entire main line of the Clarksville Mineral, which is 31 miles long, will probably be in operation by Sept. 1, connecting the Nashville, Chattanooga & St. Louis with the Memphis Division of the Louisville & Nashville near Clarksville. The main line extends from a point eight miles west of Clarksville, south through the ore mines of the old Mt. Vernon and Louise furnaces, now the property of the Gracey Woodward Iron Co., and which will supply with ore the furnace now being erected at Clarksville. From these mines the route continues south to Pond Station, three miles west of Dickson, on the Nashville, Chattanooga & St. Louis. A few short trestles comprise the only bridge work on the line. The maximum grade is 80 ft. per mile and the maximum curves eight degrees.

Maine Central.—The Coos Division, which was completed last year between Quebec Junction and North Stratford, N. H., 32 miles, will be opened by the middle of this month. The road connects with the White Mountain line at Quebec Junction near Fabyans, and extends along the north side of the Connecticut River, connecting with the Upper Coos road, and thence north to the Quebec Central at Dudswell, Que. Through this connection the road will form a new route between Boston and Quebec through the White Mountains.

Maricopa & Phœnix.—This road, which in consequence of disaster by flood has been closed for some time, is expected to be reopened for business between Maricopa and Tempe, Mex., this week, and between Maricopa and Phœnix, Ariz, May 20, 1891.

Mexican Roads.—José H. Ramirez, of Guadalajara, Mex., proposes to build a belt road round that city, and a branch to Zapopam, Ahualulco, Ameca, Cocula y Sayula, and then back to Guadalajara, making a circuit through a productive country.

Mexican Western.—Col. A. K. Owen, President of this road, states that work will begin before May 15. Funds have been secured for the first 20 miles. The line will extend from Topolobampo to Presidio del Norte on the Rio Grande, about 10 miles below El Paso, 900 miles. A contract has been signed for 150 kilometres of road on the Topolobampo end, to be finished during the current year.

Mississippi River & Bonne Terre.—The contracts for the proposed extension to Doe Run, Mo., have been let to John Scott & Sons, of St. Louis. The line is about 15 miles long, and the locating surveys have been finished and the extension is ready for construction. The line will connect with the St. Louis, Iron Mountain & Southern about 10 miles south of Bonne Terre. The grading will be mostly earthwork, but there is some rock, and bridges will be necessary over three small rivers. There will also be one combination bridge, with two spans 125 ft. long and one about 100 ft. long. The maximum grades on the line will be 95 ft. per mile and the maximum curves eight degrees. S. C. Martin is Chief Engineer.

Mohawk & Adirondack.—A certificate of incorporation of the road was filed at Albany, N. Y., this week. The company will build from Poland, Herkimer County, to Malone, Franklin County; the road to be about 150 miles long. It will run through the counties of Herkimer, Oneida, Lewis, Hamilton, Warren, Essex, St. Lawrence and Franklin. The directors are: W. Seward Webb, Henry L. Sprague, C. D. Flagg, Frank G. Smith Henry G. Gorin, Arthur H. Godfrey, James Pagan Charles Lincoln and William L. Garden, all of New York.

Mohawk Valley & Northern.—The agreement of the consolidation of the Herkimer, Newport & Poland narrow gauge line with the Mohawk Valley & Northern has been filed in the Secretary of State's office the past week. The new company is to be known by the latter name. The capital is $600,000. The capital stock of the Herkimer, Newport & Poland road was $250,000 and that of the second company was $350,000. The stock of the old companies is convertible into the stock of the consolidated road, share for share.

A contract for building 75 miles of this road from Malone, N. Y., on the Central Vermont, south through the Adirondacks toward Poland, has been awarded to Austin C. Lathrop, of Corning, N. Y.

Montana Central.—Rice & Bowman, who have the sub-contract under Foley Bros. & Guthrie for the first five miles of the branch from Monarch to Barker, Mont., have most of the clearing finished and the grading has been started at several points. About 100 men are employed on the work at present. The branch will probably be completed to Barker by July, and the line from Monarch to the Neihart mines will probably also be finished about the same time.

Mt. Carmel & Natalie.—The contractors are reported to have begun work on this branch of the Philadelphia & Reading this week, at a point about a mile west of Mt. Carmel, Pa. The engineers are still engaged on the surveying, and the sub-contracts will not be let until their work has been completed—in two or three weeks. The line will be six miles long, the terminus being at Natalie, where the Patterson Coal Co. has erected a coal breaker capable of breaking 35,000 tons of coal monthly. The route is circuitous and the grades will be very heavy. The new line reaches territory heretofore exclusively controlled by the Lehigh Valley and the Pennsylvania. All the traffic of the branch is to be transported over the Philadelphia & Reading.

Muscatine, Rock Island & Peoria.—Articles of incorporation were filed with the Secretary of State of Illinois, May 6, by this company. The capital stock is $2,000,000. The road is to be constructed from a point in Illinois opposite Muscatine, Iowa, or from Rock Island, Ill., to Peoria, Ill. The incorporators and the first Board of Directors are Andrew Perry, Peoria; William Wilmorton, J. H. Caldwell, L. J. Hodge and George O. Hodge, Winona, Ill. The principal office is to be at Peoria.

New Roads.—W. B. Berry, of Newnan, Ga., has recently organized a company to build a road from Newnan southwest to Franklin, Ga., a distance of about 30 miles. Engineers are now in the field following a route surveyed some time ago between Newnan and Franklin.

New Westminster Southern.—This road was officially inspected last week by the Dominion Inspector of Railroads and the Provincial Customs Inspector, together with officials of the New Westminster Southern and the Fairhaven & Southern. The run was made from Fairhaven to Blaine, Wash., 30 miles, in 40 minutes, and from Blaine to Liverpool, B. C., opposite New Westminster, 25 miles, in 50 minutes. The road will not be opened for through traffic until the telegraph line is complete, which will be within a few weeks.

New York, Lake Erie & Western.—The company announces that it has arranged for the exension for 40 years from July 1 next of the bonds secured by a first mortgage on the Buffalo branch at the rate of four per cent. per annum.

New York & South Beach.—The company was incorporated in New York last week. The road is to be constructed from the terminus of the Staten Island Rapid Transit road at Arrochar, thence along the south shore of Staten Island to a point near Cedar Grove, New Dorp beach. The line will be three miles long.

Norfolk & Western.—The company is now operating about 31 miles of double track on its main line and 12 miles on its New River Division, which has been completed this spring. The second track on the main line is from Roanoke to Elliston, Va., 20 miles, and from Christiansburg to Radford, 11 miles. The work between Elliston and Christiansburg will be very heavy mountain work, and may not be undertaken this spring. It will, however, be the next second track to be built. The double-tracking of the main line has been very expensive, for the work has been mostly rock excavation, with many bridges. In the construction of the second track the line was straightened and the grades reduced so that the maximum eastward, the direction of loaded traffic, has been reduced from 87 ft. per mile to 53 ft., and the maximum grade westward from 91 ft. per mile to 78 ft.

Northern Pacific.—Henry & Balch, of Minneapolis, who have the contract for building the Lake Washington Belt Line, near Seattle, Wash., have about 250 men at work. Nearly 23 miles of the line has been graded, and some four miles of track has been laid this spring. The maximum grades are 52 ft. per mile and the maximum curves 10 degrees. The engineers in charge have had some difficulty in building the road across Mercer Slough, and it has proved to be an interesting piece of engineering work. Mercer Slough is 2,700 ft. long, with soft soundings 100 ft. deep. A trestle of 700 ft. has been built over the creek in the centre of it. The piles in this are driven. They are all 100 ft. long, and stand 95 ft. in the ground, and they are among the longest piles ever driven without splicing with a land driver. On the other 2,000 ft. of this swamp the line is carried on a brush mattress crossed with logs 80 ft. long. The weight of the bank (about a 4-ft. bank) takes this timber down until it is entirely under water. The surface of this swamp is just about the some height as that of Lake Washington, with which it is connected, and is covered with a growth of brush. The embankment is all made except about 75 ft. This has dropped into the swamp, but is nearly filled again. The cost of this bank is about $15 per foot of line. The cost of the trestle is about the same as the bank. H. C. Estep, Assistant Engineer, has charge of the construction of the line.

Omaha, Kansas Central & Galveston.—The preliminary surveys which have been in progress from

Lyons, Kan., south since December, have been completed through Kansas and the Indian Territory to Denison and Greenville, Tex. The officers state that the contracts for building part of the line in Kansas will be let shortly. The character of the work will be about the average of Western roads. The maximum grade is one per cent., and the maximum curves are four degrees. C. M. Rawlings, Lyons, Kan., is Vice-President; Edward Roemer, of New York City, is the Chief Engineer.

Orange & Keysville.—A motion for the appointment of a receiver for this company will be argued before the Virginia Chancery Court on June 2. The road is projected to extend from a point in Orange County to Keysville, in Charlotte County, Va. The track has been laid on about 18 miles between these points, and a large part of the grading has been finished.

Oxford & Coast Line.—The company has been voted bonds to the amount of $40,000 by the town of Oxford, N.C., at an election held last week. The company has been organized under a special charter of the North Carolina legislature, and proposes to build a road from Oxford southwest, via Wilkins, Louisburg and Spring Hope, or Nashville to Wilson, N. C., on the Wilmington & Weldon. The line will be about 60 miles long, and the company proposes to let the contract for grading at least that part of the line between Oxford and Nashville, before July.

Philadelphia, Harrisburg & Pittsburgh.—The Philadelphia & Reading issued a mortgage last week on the property of this company for $2,000,000. It is to bear five per cent. interest, but the bonds to be issued under it will not be placed on the market until the fall.

Philadelphia & Reading Terminal.—The contracts for the masonry work on the new Philadelphia terminal have been awarded to Samuel Hart & Son and J. J. Ryan, of Philadelphia, by Wilson Brothers & Co., the architects and engineers of the Terminal Company. An approximate estimate places the work to be done as follows: Masonry in column foundations, 1,900 cu. yds.; in piers and abutments, 20,000 cu. yds.; in retaining walls, 26,000 cu. yds. Concrete is to be used as circumstances require. The cost of the work has been roughly estimated at $500,000.

Quebec & Lake St. John.—Last week the Government Engineer made a tour of inspection on the new branch of this road extending from Loretto to Quebec, and formally approved the work.

Rio Grande Southern.—It is stated that the tracklaying will be resumed this week on the extension south of Telluride, Col., to which the road has been operated during the winter. The tracklaying will probably begin at Ilium, and it is expected that it will reach Rico about Aug. 15.

Rusk, New Birmingham & Dallas.—The charter of the company was filed in Texas last week. The road is to be built from New Birmingham west to Rusk, Tex., and thence to some point on the International & Great Northern between Palestine and Troupe, in Smith County. The line will be about 20 miles long. The capital stock is $200,000.

Tacoma Eastern.—The company has made a proposition to the people of Whidby Island, Wash., that if they will agree to bond to the said company 2,000 acres of land near Admiralty Head and also raise a subsidy of $150,000 the company will begin the construction of a road to extend from Admiralty Head to La Conner, and thence to Mount Vernon, on the Skagit River, and to a connection with a transcontinental road. This line was surveyed and located last season, but nothing further was done.

York & Peach Bottom.—The consolidation of the York & Peach Bottom with the Maryland Central has been approved by the stockholders of both companies, at meeting held this week. The new corporation will be known as the Baltimore & Lehigh. The system will probably be extended north of York across the Susquehanna to a connection with the Cornwall & Lebanon road, thence to Lebanon, Pa., and north to a connection with the Lehigh Valley at Tremont in the Schuylkill anthracite coal region of Pennsylvania.

GENERAL RAILROAD NEWS.

Cape May & Sewell's Point.—The road is soon to be sold under foreclosure of the first mortgage bonds. It extends from Sewell's Point to Cape May, N. J., and is six miles long. It connects with the West Jersey at Cape May.

Charleston, Cincinnati & Chicago.—The bondholders of the company have agreed to a plan of reorganization, under which they give up their first lien on the property for $6,567,000, and admit a new mortgage for $2,500,000, to be placed ahead of their bonds. The proceeds of this new loan will be used in completing a number of gaps in the line of the road in Tennessee.

Cleveland, Cincinnati, Chicago & St. Louis.—A special meeting was held in Cincinnati, May 6, to vote on the three following propositions, which were adopted: The first was to authorize the execution of an operating contract with the Cincinnati, Wabash & Michigan; the second to authorize the issuing of $4,000,000 four per cent. bonds, dated May 9, 1891, and falling due July 1, 1991; the third to authorize the execution, together with the Cincinnati, Wabash & Michigan, to secure those bonds, of a first mortgage, on the property of the latter, including the interest of the Cleveland, Cincinnati, Chicago & St. Louis in the road-operating contract.

Manchester & Lawrence.—William G. Russell, of Boston; Judge H. H. Wheeler, of Brattleboro, Vt., and Robert Harris, of New York, acting as referees, are engaged in a hearing on a bill in equity involving a million dollars, a suit brought by the Manchester & Lawrence to compel the Concord road to account for the property obtained while the two roads were being operated together.

Meadville & Linesville.—The interest on the six per cent. first mortgage bonds, which amount to $150,000, was defaulted this week. A receiver was appointed some months ago. The foreclosure sale has been ordered to take place at Meadville, Pa., May 23. The road is 21 miles long, and extends from Meadville to Linesville, Pa. It is expected that the road will be purchased by the Pittsburgh, Shenango & Lake Erie.

Mexican Central.—The annual report of the company for 1890 shows a surplus for the year over all charges of $495,779, although subsidy collections for six months only were included in the income account. Operations for 1890, compared with 1889, show as follows: Gross earnings (Mexican silver), $6,425,694; increase, $88,468. Net earnings (Mexican silver), $2,424,524; decrease, $400,875. Net earnings (United States money), $1,979,156; decrease, $117,900. Net subsidy (United States money), $601,126; decrease, $211,785. Surplus (United States money), $495,779; decrease, $290,206. The income from all sources available for interest was $2,597,236, and after paying taxes, premium, interest, etc., there is a surplus of $495,798. Concerning the subsidy the report says: "It was agreed between the government and the company that on June 30, 1890, the net balance of subsidy due the company was $19,820,793 (Mexican currency). It was also agreed that the average time for the payment of this balance was, if paid all at once, four and one-sixth years. The company and the government settled on this basis at a discount of six per cent. per annum, and accordingly $14,865,594 (Mexican currency) was paid the company in four installments by the Mexican Government. With this payment the Trustees have bought as an investment $5,597,000 of the company's priority bonds. The balance of the issue of $7,000,000 of said bonds then outstanding, $1,403,000, was duly called for payment and cancellation on April 10, 1891." The subsidy accounts have not yet been settled, but it is estimated that about $4,400,000 will be applicable for payment of principal and interest of the consolidated mortgage bonds. The principal work during the year has been done by the Tampico Harbor Co. upon the jetties at the mouth of the Panuco River. The result of the work has been entirely satisfactory. Toward the latter part of the year the water should be deep enough to admit large vessels.

Minneapolis & St. Louis.—The Farmers' Loan & Trust Co. has commenced an action against the company for the appointment of a general receiver to operate the line. The trust company now has possession of the road by virtue of being the trustee of the bondholders, who hold the certificates of the road's indebtedness to the amount of $374,000. Henry Seibert, a bondholder, commenced foreclosure proceedings some time ago, and during the proceedings the other bondholders were refused the interest due until Judge Lochren filed a decision ordering Receiver Truesdale to pay the interest. It is claimed by the Farmers' Loan & Trust Co. that the present receiver is acting detrimental to the bondholders it represents.

New York, Lake Erie & Western.—The following table shows the earnings of the company for March, 1891, and the six months from October 1, compared with the corresponding period of last year:

March:	1891.	1890.	Inc. or Dec.
Gross earnings	$2,291,280	$2,242,488	I. $48,791
Oper. expenses	1,481,874	1,446,208	I. 35,666
Total	$809,406	$796,280	I. $13,126
Less proportions due leased lines	$194,662	$192,705	I. $1,957
Net earnings	$614,744	$603,575	I. $11,169
Oct. 1 to March 31:			
Gross earnings	$14,122,759	$13,926,793	I. $195,966
Oper. expenses	9,480,104	9,174,610	I. 305,494
Total	$4,642,655	$4,752,183	D. $109,528
Less proportions due leased lines	$1,263,155	$1,278,537	D. $15,382
Net earnings	$3,379,500	$3,473,646	D. $94,146

Northern Pacific.—The directors have authorized the purchase in the market of the preferred stock of the company with the money to be received from the Manitoba land case recently decided by the United States Supreme Court in favor of the Northern Pacific. The rehearing asked for by the Manitoba Company has been denied by the Supreme Court, and the case permanently closed. The directors have also authorized the expenditure of $2,000,000 for the improvement of the property. By reducing grades at certain points $500,000 a year can be saved in operating expenses.

Pittsburgh, Shenango & Lake Erie.—The United States Circuit Court at Pittsburgh granted an order this week relieving the Receiver, F. W. Huidekoper, of Meadville, Pa., from the control of the road, and transferring the property to the company on May 1. The receiver reported that he had secured enough funds to discharge all of the indebtedness of the company.

Pittsburgh & Western.—The nature of the agreement with the Baltimore & Ohio was explained offi- first time at the annual meeting, May 4. President H. W. Oliver said: "It was deemed best for the interests of all concerned that a closer alliance be made with the Baltimore & Ohio, which is the natural outlet for our lines both east and west, and a modification of the existing contract with that company has been agreed upon by which it is provided that after the completion of the Akron & Chicago Junction road, which will be in operation in six weeks, and will connect our line at Akron with the Baltimore & Ohio at Chicago Junction, the latter company will, as a rule, make the Pittsburgh & Western a part of its through route for all traffic subject to its control originating at Pittsburgh or passing over its Pittsburgh division destined to Cleveland or Chicago or intermediate points, or destined to Pittsburgh or points on said Pittsburgh division. Other modifications of the present contract have been agreed upon which are greatly to the advantage of this company. To properly handle the large passenger traffic which the Baltimore & Ohio will throw over our other lines, it will be necessary to put the road in first-class condition between Pittsburgh and Akron, and to extend, and possibly complete, the double track between Pittsburgh and New Castle Junction. To provide funds for this work and also to pay off the present floating debt of the company, it is proposed that $2,000,000 of new bonds be issued, which shall be a first lien on the company's property in Ohio at present unincumbered, and a second lien on all other property of the company. The matter will be presented at a meeting of the stockholders called for May 21. A syndicate of parties largely interested in the securities of the company has agreed to purchase sufficient of the new issue of bonds to pay off the entire floating debt of the company." The annual report for the year ending March 31, 1891, showed gross earnings of $2,207,015; operating expenses, $1,488,436, and net earnings of $718,579.

Tavares, Orlando & Atlantic.—This road is now operated by the Florida Central & Peninsular as a part of its southern division. The road was purchased by the latter company at a recent foreclosure sale which was held in accordance with decrees entered in the United States Circuit Court for the Northern District of Florida, in the suit brought by W. Bayard Cutting, Trustee. The receiver surrendered possession of the property to the purchasers April 30. The road extends from Tavares to Orlando, Fla., 32 miles.

TRAFFIC.

Chicago Traffic Matters.

CHICAGO, May 6, 1891.

The traffic situation here remains practically unchanged this week. There are a number of vital matters pending, but no action will be taken until after the meeting of the Advisory Board of the Western Traffic Association.

Nothing especially noteworthy has developed in regard to the fight of the Alton against the eastern roads. The acquiescence of the Vandalia and Chicago & Grand Trunk in the orders of the Board of Rulings will strengthen the Eastern lines in their position. The Alton officers, however, profess not to be disturbed, and claim to be more than holding their own and express themselves as confident of winning.

Chairman Finley, of the Western Passenger Association, has issued notice of the restoration of rates from St. Louis to Chicago and from Kansas City to St. Louis to standard tariff, limited to one day from sale, effective May 17. These are the rates which were reduced to meet the irregular rates made by the Jacksonville Southeastern. In his notice of restoration, Chairman Finley says that it is his belief that the equalization contemplated by the agreement can now be obtained upon the basis of standard tariff rates. In other words, he decides that the market is free from the disturbing tickets. The Alton is not inclined to consent to this restoration claiming that it may be compelled to reduce rates itself to meet the situation it may find itself placed in; also on the ground that it requires unanimous consent to raise rates. The latter objection is met on the ground that this is not an advance, but a restoration to tariff, and the chairman decides that he was authorized by the vote which reduced the rates to restore them whenever he was satisfied that the end sought for had been obtained. Should the Alton refuse to comply with the order, it will seriously complicate the situation.

The joint committee of the Trunk Line and Central Traffic Associations have agreed that on carload freight not weighed before being loaded, where the scale weight as ascertained after loading does not exceed the billed weight 500 lbs. the billed weight shall be accepted; if the excess is over 500 lbs., an allowance of 500 lbs. shall be deducted from the gross weight, but in cases where the actual weight is obtained after loading or before unloading no such allowance shall be made.

The question of harvest excursion rates for the season, which at first threatened to demoralize all passenger rates in the territory west and southwest of Chicago, has been happily averted by an agreement not to make such rates this season. The Missouri Pacific announced four of these excursions, one each month, at fare one way to Texas points via Memphis. The Missouri, Kansas & Texas put in effect the same arrangement, carrying the rate into Kansas (to Junction City), and the St. Louis & San Francisco put in the rate at St. Louis; and at one time it looked as though it would spread over the whole territory. But a conference was arranged between President Manvel and Vice-President Clark, and the latter ordered the rates withdrawn.

Traffic Notes.

The East Tennessee, Virginia & Georgia has withdrawn from the Southern Passenger Association.

The total cotton receipts at New Orleans by the Louisville, New Orleans & Texas for this season from Sept. 1 to April 30, inclusive, were 439,845 bales, which still leaves four months to complete the season. The largest receipts ever carried to New Orleans by this line for any previous season was last year, when they reached 439,113 bales for the 12 months.

At the Trunk Line meeting April 30 to consider the reduced freight tariff from New York to St. Paul by the West Shore, the Rome, Watertown & Ogdensburg and the Canadian Pacific, which caused so much discussion, the roads interested agreed to withdraw it. The West Shore's claim to be allowed to issue such a tariff is to be considered at a subsequent meeting.

Report on the New York & Northern Complaint.

The Interstate Commerce Commission, in an opinion by Chairman Cooley, has decided the case of the New York & Northern against the New York & New England, the Housatonic, and the New England Terminal Company, in favor of the complainant. The complaint alleged violation of the third section of the law, which requires carriers to afford all reasonable, proper and equal facilities for interchange of traffic between their respective lines. The New York & New England billed through to New York by complainant's road, but on making an arrangement with the Housatonic for New York business withdrew the facilities over the New York & Northern. It is decided that where a road, having ample facilities for physical connection and through business with a connecting line, with which it has in the past long had an arrangement for doing a through business on a pro-rating basis, terminates that arrangement without any good reason and enters into a similar arrangement with another connecting line, and refuses further through business over its former connection, this conduct is unjust discrimination within the meaning of the language of the law. The order directs that the New York & New England cease this discrimination.

East-Bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Saturday, May 2, amounted to 52,989 tons, against 54,433 tons during the preceding week, a decrease of 1,444 tons, and against 80,108 tons during the corresponding week of 1890, a decrease of 27,119 tons. The proportions carried by each road were:

	Wk. to May 2.		Wk. to April 25	
	Tons.	P. c.	Tons.	P. c.
Michigan Central	7,191	13.6	7,276	13.4
Wabash	5,430	10.2	5,606	10.3
Lake Shore & Michigan South.	6,982	13.2	7,219	13.3
Pitts., Ft. Wayne & Chicago	5,575	10.5	6,194	11.4
Chicago, St. Louis & Pitts.	6,920	13.1	7,342	13.5
Baltimore & Ohio	3,314	6.2	2,299	4.2
Chicago & Grand Trunk	5,131	9.7	6,904	12.6
New York, Chic. & St. Louis	6,427	12.1	5,107	9.4
Chicago & Atlantic	6,019	11.4	6,495	11.9
Totals	52,989	100 0	54,433	100.0

Of the above shipments 4,140 tons were flour, 20,963 tons grain, 3,661 tons cured meats, 1,472 tons lard, 7,224 tons dressed beef, 913 tons butter, 832 tons hides, 207 tons wool and 6,012 tons lumber. The three Vanderbilt lines together carried 38.9 per cent., while the two Pennsylvania lines carried but 23.6 per cent.